केंद्रीय भूमि जल बोर्ड

जल संसाधन, नदी विकास और गंगा संरक्षण मंत्रालय

भारत सरकार

Central Ground Water Board

Ministry of Water Resources, River Development and Ganga Rejuvenation

Government of India

Report

on

AQUIFER MAPPING AND GROUND WATER MANAGEMENT

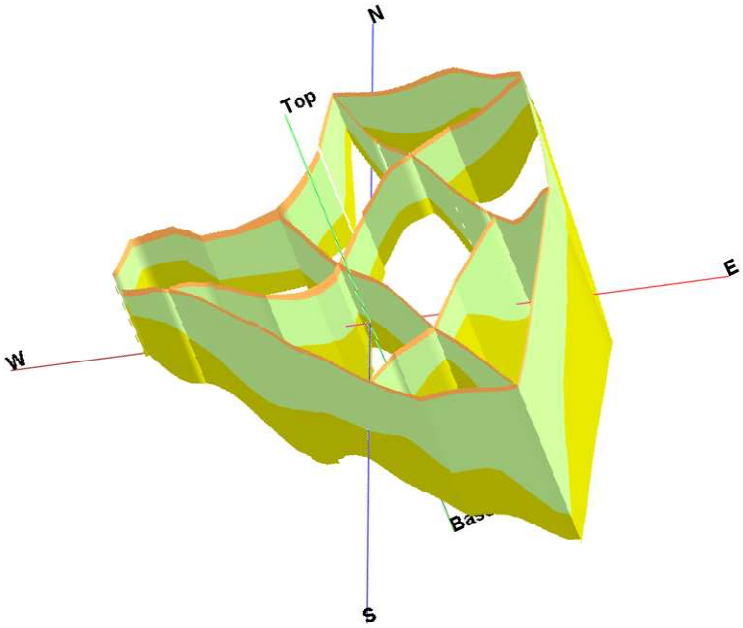
Bhavani River Basin, Tamil Nadu

दक्षिण पूर्वी तटीय क्षेत्र, चेन्नई

South Eastern Coastal Region, Chennai

सरकारीउपयोगकेलिए

REPORT ON AQUIFER MAPPING AND GROUNDWATER MANAGEMENT PLAN FOR BHAVANI RIVER BASIN AQUIFER SYSTEM, TAMIL NADU



Government of India

Ministry of Water Resources, River Development & Ganga Rejuvenation

Central Ground Water Board, South Eastern Coastal Region

Chennai

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Foreword

Groundwater is the major source of freshwater that caters the demand of ever growing domestic, agricultural and industrial sectors of the country. This renewable resource has been indiscriminately exploited in some parts of the country by several users as it is easily available and reliable. Intensive and unregulated groundwater pumping in many areas has caused rapid and widespread groundwater decline. Out of 6607 ground water assessment units (Blocks/ mandals / taluks etc.), 1071 units are over-exploited and 914 units are critical. These units have withdrawal of ground water is more than the recharge (over exploited) and more 90% 7 less than 100% of recharge (Critical).

Central Ground Water Board (CGWB) has taken up largest Aquifer mapping endeavour in the world, targeting total mapable area of country ~ 23.25 lakh sq. km with a vertical extent of 300 m in soft rock area and 200 m in hard rock area. The extent of aquifer, their potential, resource availability, chemical quality, its sustainable management options will be addressed by National Aquifer Mapping (NAQUIM). The NAQUIM programme will also facilitate participatory management of ground water to provide long term sustenance for the benefit of farmers. Currently, focus is on ground water stressed areas of eight states comprising 5.25 lakh sq.km viz. Tamil Nadu, Haryana, Punjab, Rajasthan, Gujarat, Andhra Pradesh, Telangana, Karnataka and Bundelkhand region.

South Eastern Coastal Region, Central Ground Water Board, Chennai under NAQUIM has been envisaged with the Mapping of an area of 70,102 sq.km during 2012-17 (XII five-year plan) in Tamil Nadu and UT of Puducherry. This report deals with the Aquifer mapping studies carried out in water stressed Bhavani basin covering an area of 10391 sq .km with a hilly area of 1198 sq.km and the total mappable area is 9193 sq.km. The basin comprises of seven districts of parts of Coimbatore, Erode, Namakkal, Nilgiris Karur, Salem and Tiruppur with 97 firkas (56 Over Exploited & Critical), and is mainly dependent on groundwater (85%) for its agricultural needs. The major issues in the basin include declining groundwater levels, sustainability of wells, heavy metal contamination due to industrial clusters and high Fluoride concentration in patches leading to risk of dental and skeletal fluorosis. Two aquifer units were deciphered with aquifer Unit - I being the weathered, occurs from ground level to 38 m bgl and Aquifer Unit –II is the fractured/Jointed zone existing from 10 to 200 m bgl (3-4 fractures are encountered). In order to arrest the declining groundwater levels and to increase the sustainability of wells groundwater management plans for supply and demand side interventions have been formulated firka wise.

I hope this report will be useful for the district administrators, water managers, stakeholders including farmers in knowing the aquifer and managing it resources effectively in the Bhavani aquifer system.

A.Subburaj
Head of Office

EXECUTIVE SUMMARY

Aquifer mapping studies were carried out in the Bhavani aquifer system covering a mappable area of 9193 sq. km. covering districts of parts of Coimbatore, Erode, Namakkal, Nilgiris Karur, Salem and Tiruppur districts of Tamilnadu. The data pertinent to geology, geophysics, hydrology, hydrochemistry was collected, synthesised and analysed to bring out this report. This report mainly comprises the Aquifer geometry and Aquifer properties of the study area which are considered to be measuring scales for groundwater availability and potentiality. Keeping these parameters in view a sustainable management plan has been suggested through which the groundwater needs can be fulfilled in a rational way.

Area experiences semi-arid climate with 750 mm average annual normal rainfall (100 years). The Nilgiris district experiences high rainfall of above 2000mm. About 58% of the geographical area is under agricultural activity in the basin. The main crops irrigated are paddy, sugarcane, groundnut, maize, cotton, ragi and other minor crops are turmeric, vegetables and flowers.

Integrated study helped in deciphering main aquifer units, weathered zone at the top followed by a discrete anisotropic fractured/fissured zone at the bottom. Groundwater occurs under unconfined condition in the weathered zone and unconfined to semi-confined conditions in the fractured/fissured zone and flows downward from the weathered zone into the fracture zone. The predominant water levels are in the range of 1.19 -22.63 m bgl during pre-monsoon season and 1.13 – 21.32 mbgl during post-monsoon season (2015). The net annual ground water availability is 1369.9 MCM and the gross ground water draft is 1400.3 MCM and the average stage of groundwater development is of 103%.

The major issues in the basin include declining groundwater levels, sustainability of wells, heavy metal contamination due to industrial clusters and high Fluoride concentration in patches leading to risk of dental and skeletal fluorosis. The fluoride levels in the ground waters of the basin exceed the permissible limit of 1.5ppm in Karur and isolated patches in Namakkal and Erode districts due to geogenic contamination. This problem is addressed through alternate drinking water supply to the affected villages from Bhavani sagar reservoir.

Aquifer systems from the area can be conceptualized as weathered zone down to ~38m and fractured zone between ~10-200 m bgl with possibility of occurrence 3 to 4 fractures. The weathered zone is disintegrated from the bed rock (upper part–saprolite zone) and partially/semi weathered in the lower part (sap rock zone) with yield ranging from 15-25 m^3/hr and can sustain for 1 to 2 hrs of pumping during summer period (April to June). The fractured zone is fractured Gneiss or Charnockite which occur in limited extent, associated sometime with quartz vein. The average yield ranges from 2 - 15 m^3/hr and can sustain for 2 to 3 hrs of pumping during summer period.

Fast growing urban agglomeration shares the groundwater which otherwise is being used for irrigation purpose resulting in either shortage for irrigation needs or creates excessive draft to meet the both demands in groundwater potential areas. The study formulates management strategies for supply side as well as demand side. The supply side measures include construction of artificial recharge structures of 81 Check dams, 412 Nala Band, 1266 recharge shafts in addition to the 480 ponds earmarked for rejuvenation with recharge shafts in all the 56 OE & Critical firkas of the basin. The estimated cost for construction of these structures is to be Rs. 183.17 Crores. The estimated recharge to groundwater system through these structures will be in the order of 80 MCM. In addition water conservation plan is proposed through low pressure water distribution system in 1590 sq.km irrigation area and digging of 6370 recharge ponds which support storage as well as recharge. Demand side management is also recommended by change in irrigation pattern from flooding method to Ridge & furrow for paddy and flooding to drip for sugarcane and banana crops. This intervention would save 262 mcm of water annually. By carrying out both supply and demand side interventions the stage of groundwater development would be lowered from 103 to 77%.

The existing regulatory measures may be modified suitably for optimal utilization of groundwater as well as for sustainable development of rural agricultural based economy. To achieve this goal opinion pool has to be obtained from more user groups and valid suggestions may be incorporated in the regulatory acts for the Bhavani River basin aquifer system.

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BHAVANI BASIN AQUIFER SYSTEM TAMIL NADU

1 INTRODUCTION

Central Ground Water Board, Ministry of Water Resources, River Development and Ganga Rejuvenation, New Delhi had been assigned to carry out National Aquifer Mapping (NAQUIM) in country wide under XII five-year plan on 1: 50,000 scale. National Aquifer Mapping (NAQUIM) involves in deciphering the aquifers in terms of configuration, quantity, quality, rejuvenation and sustainability. Aquifer mapping is prepared by integrating hydrogeological information such as geology, geophysics, hydrology and hydro-chemistry and analysed to characterise the quantity, quality and sustainability of ground water in aquifers.

The unplanned ground water development due to intensive agricultural practices and unorganised urban acclamation, erratic rainfall had changed the groundwater scenario into stress conditions. The groundwater in stressed aquifer is required planned and proper management in respect of demand and supply side intervention. The groundwater occurs in very complex conditions particularly in hard crystalline formation wherein high varied and diverse hydrogeological settings exist. The groundwater movement and occurs in weathered and fractured hard rock formation. It is essential to understand the complex geometry of the aquifer systems of the area to prepare implementable ground water management plans. Hence, aquifer mapping is required to have groundwater management plan. The proposed management plans will provide the “Road Map” for ensuring sustainable management and equitable distribution of ground water resources, thereby primarily improving drinking water security and irrigation coverage. The aquifer mapping and management plan will be shared by the groundwater user agency and stock holder. The user agency is mainly of the State Government and Agriculturist. The application of aquifer mapping is felt only when it reaches to effective implementation of the management plan. This can be achieved only through community participation.

1.1 Objective and Scope

Aquifer mapping itself is an improved form of groundwater management – recharge, conservation, harvesting and protocols of managing groundwater. These protocols will be the real derivatives of the aquifer mapping exercise and will find a place in the output i.e, the aquifer map and management plan. The activities under NAQUIM are aimed at:

- Identifying the aquifer geometry,
- aquifer characteristics and their yield potential
- quality of water occurring at various depths,
- aquifer wise assessment of ground water resources
- preparation of aquifer maps and
- Formulate Firka wise ground water management plan.

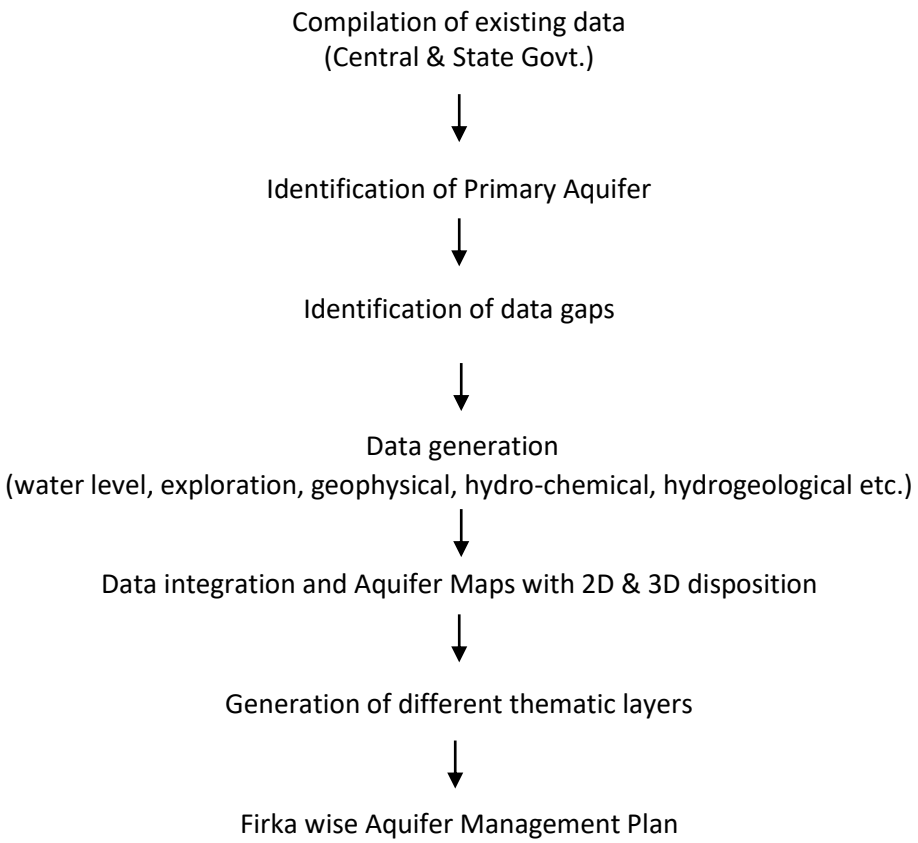
This clear demarcation of aquifers and their potential will help the agencies involved in water supply in ascertaining, how much volume of water is under their control.

1.2 Approach and Methodology

The ongoing activities of NAQUIM include toposheet wise micro-level hydrogeological data acquisition supported by hydrogeological, geophysical and hydro-chemical investigations supplemented with ground water exploration down to the depth of 200 / 300 meters.

Considering the objectives of the NAQUIM, the data on various components was segregated, collected and brought on GIS platform by geo-referencing the available information for its utilisation for preparation of various thematic maps.

The approach and methodology followed for Aquifer mapping is as given below:



1.3 Study area

Central Ground Water Board, South Eastern Coastal Region, Chennai has taken up NAQUIM in Bhavani River basin aquifer system to prepare aquifer map and its management plan. The Bhavani River basin is located in the western part of Tamil Nadu, bounded by Upper Cauvery River basin aquifer system in north, Amaravathy River basin aquifer system in south, Lower Cauvery River aquifer system in east and Karnataka state in west. The total geographical area of the study area is 10,391 sq.km in which hilly area is covered by 1198 sq km. The mappable area in the study area is 9,193 sq.km. The study area is comprising of 7 nos of districts and 95 Firkas (the local revenue sub-divisions). There are 55 nos firka categorised as over exploited and critical as per the groundwater resources-2013. The study area is shown in location map figure 1.1. and the details of the study area is shown in table 1.1.

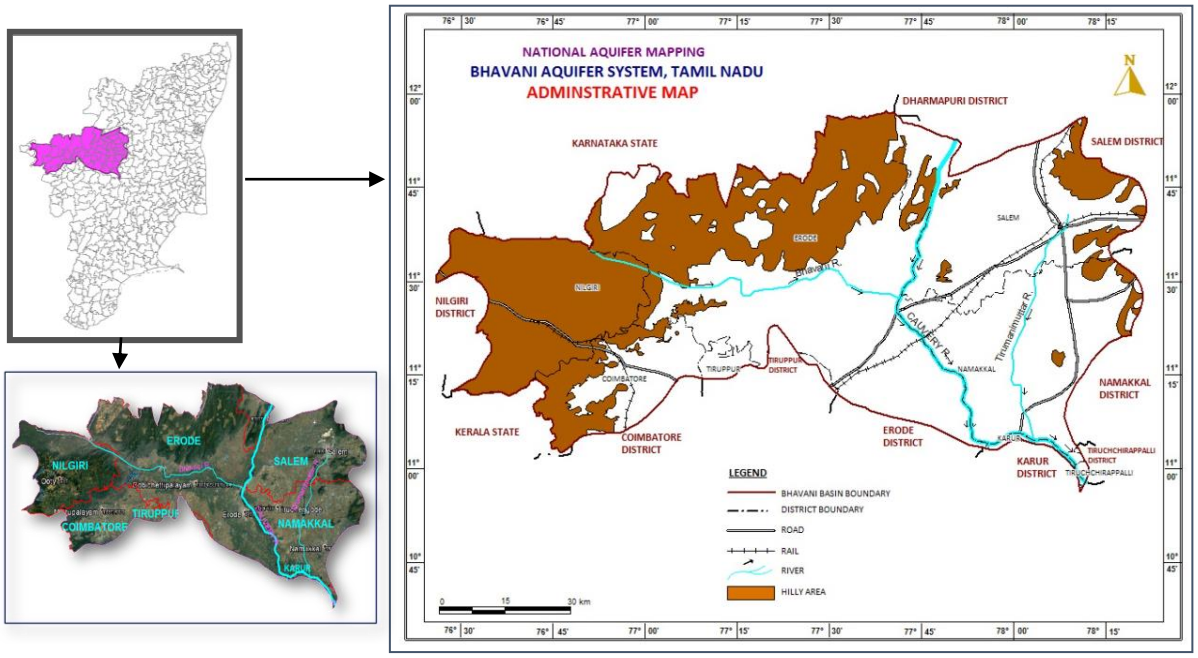


Fig.1.1: Location Map of the area

Table -1.1 The details of the study area

Sl. No	District	Area	No. of Firka	No. of OE and Critical Firka
1	Coimbatore	767	5	3
2	Erode	3187	31	15
3	Karur	49	0	0
4	Namakkal	2272	22	15
5	Nilagiri	1972	11	0
6	Salem	1962	25	19
7	Tiruppur	182	1	0
	Total	10391	95	52

1.4 Data Adequacy and Data Gap Analysis

The available data such as Exploratory wells, Vertical Electrical Sounding (VES), ground water monitoring stations and ground water quality stations of Central Ground Water Board, South Eastern Coastal Region, Tamil Nadu Water Supply and Drainage Board (TWAD), State Surface and Ground Water Resources Data Centre of Public Works Department, Government of Tamil Nadu were compiled and analysed as per the nomenclature for adequacy of the data. The summarised detail on Data Adequacy and Data Gap Analysis is presented in the table 1.2.

Table – 1.2: Data Adequacy and Data Gap Analysis

Sl.no	Data	Required	Available	Gap
1	Exploratory well	57	146	0
2	Geophysical survey	310	279	31
3	Groundwater Monitoring well	57	321	0
4	Groundwater Quality Monitoring well	57	311	0

1.5 Rainfall

The average annual rainfall of the Bhavani basin is 811.47 mm and the computed annual rainfall of the basin ranges from 544.70 mm at Annur of Coimbatore district and 2251.00 mm in Gudalore of Nilgiri district. The rainfall distribution is shown in Fig-1.2 and the details of station given in table -1.3

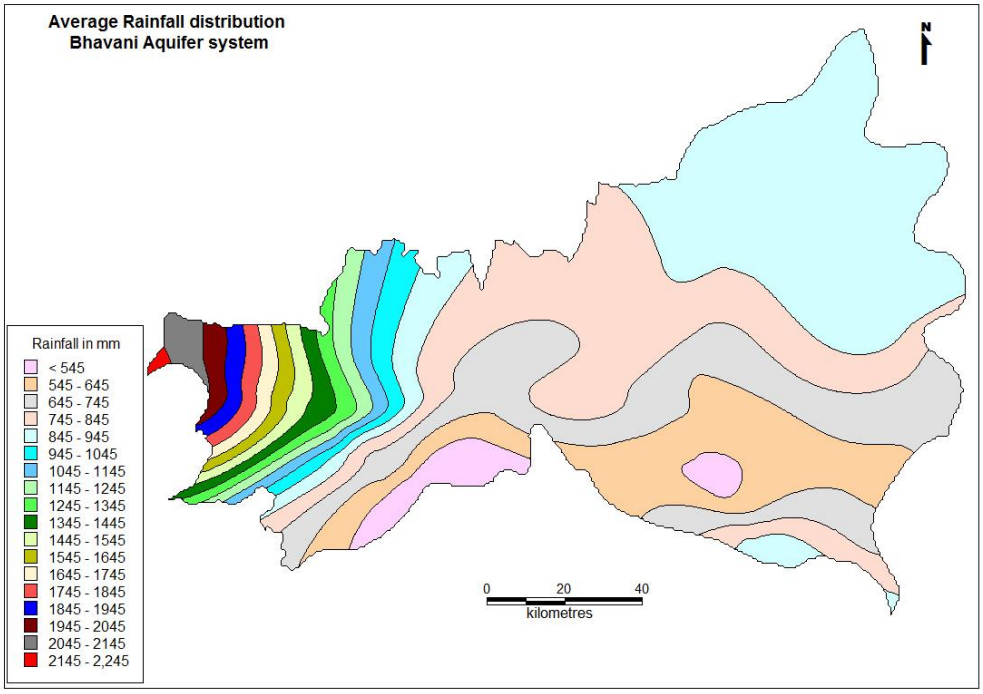


Fig.1.2: Rainfall distribution of the area

Table – 1.3: details of Rain Gauge station

Sl.no	Station Name	lat	long	Rainfall (mm)
1	Mettur	11.81	77.80	976.94
2	Salem City	11.67	78.16	1005.45
3	Sankagiri	11.47	78.87	782.89
4	Namakkal	11.22	78.17	734.34
5	Komarapalayam	11.46	77.72	729.47
6	Ammapettai	11.62	77.74	848.06
7	Bhavani Sagar	11.45	77.68	778.76
8	Gobichettipalayam	11.45	77.43	885.99
9	Sathiyamangalam	11.50	77.25	809.27
10	Modakurichi	11.23	77.78	628.60
11	Erode	11.08	77.89	998.44
12	Mettupalayam	11.30	76.97	826.21

13	Annur	11.23	77.11	544.70
14	Kothagiri	11.41	76.85	1475.20
15	Gudalore	11.51	76.47	2251.00

The highest rainfall is experienced in the hilly region of the aquifer basin and progressively reduced towards plain region occurring in the eastern parts of the region. The basin receives rainfall from both monsoon, south west (June-September) and north-east monsoon (October-December) particularly in Nilagiri district. The lion share of rainfall is from north-east monsoon for the entire area except in Nilagiri district.

1.6 Physiography

Based on the SRTM DEM (Cauvery Basin-2014), the study area is divided into eight zones ranging from 200 -300m to 2000-3000mt. The study area is having hilly region falling in the western part formed by Western Ghats Hill ranges trending NE-SW direction. The hilly region is occupied in Nilagiri, Erode and Coimbatore districts and covering 1198sq.km area. The plain terrain is found in the eastern parts of the study area, falling in Namakkal, parts of Coimbatore, Erode, and Salem districts. The general slope of the study area is towards SE direction. The lower elevation is found in all along the River valley of Cauvery River (Fig-1.2). In western part of the study area, the elevation is formed by the Nilagiri hill, part of Western Ghat with maximum elevation of 2637 maml and highest point is called Doddabetta. In northern part of the study area, hills are formed by Bhavani and Sathyamangalam hill ranges.

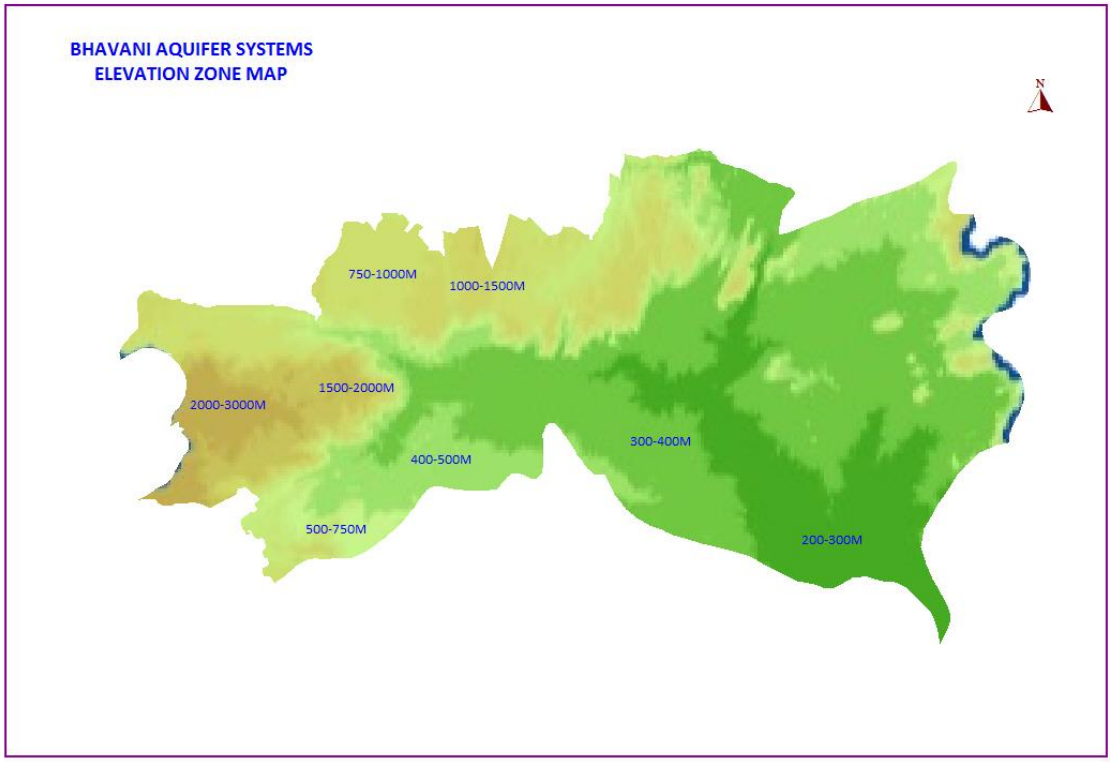


Fig.1.3: Elevation Map of the area

1.7 Hydrology and Drainage

Bhavani, Moyar, Cauvery and Thirumanimuthar Rivers are major rivers flows in the study area. The Bhavani is a perennial river, rising in Attappadi valley in Kerala. It enters Tamilnadu near Mannar and traverses from West to East for 234 km. and joins the Cauvery near Bhavani TownMoyar River is tributary of Bhavani river and confluence with Bhavani at Bhavanisagar Dam. The Cauvery River is biggest river in south India. It rises at Talakaveri on the Brahmagiri range in the Western Ghats in Karnataka at an elevation of about 1341 m above mean sea level and flows for about 800 km, before its outfall into the Bay of Bengal. The Cauvery river system consists of 21 principal tributaries each with catchment area around 250 sq. km. In the study area, Cuavery River flows from Dharmapuri district and confluence with Bhavani River. All the Rivers receives runoff from the South-West monsoon and occasional floods during North-East Monsoon. Thirumanimuthar River originates in Salem district and confluence with Cauvery River, Namakkal district. The study area is having dendritic to sub-dendritic drainage pattern. The high density is found in the hilly region falling western parts of the study area (Fig-1.3).

In the study area, a medium irrigation projects namely, Lower Bhavani Dam is used for irrigation purposes. This dam is the longest in the basin with a maximum length of 8.79 km and is located on the river Bhavani. The catchment area of this reservoir is 4200 sq. km. The gross and live storage of the reservoir is 929 MCM and 908 MCM respectively.

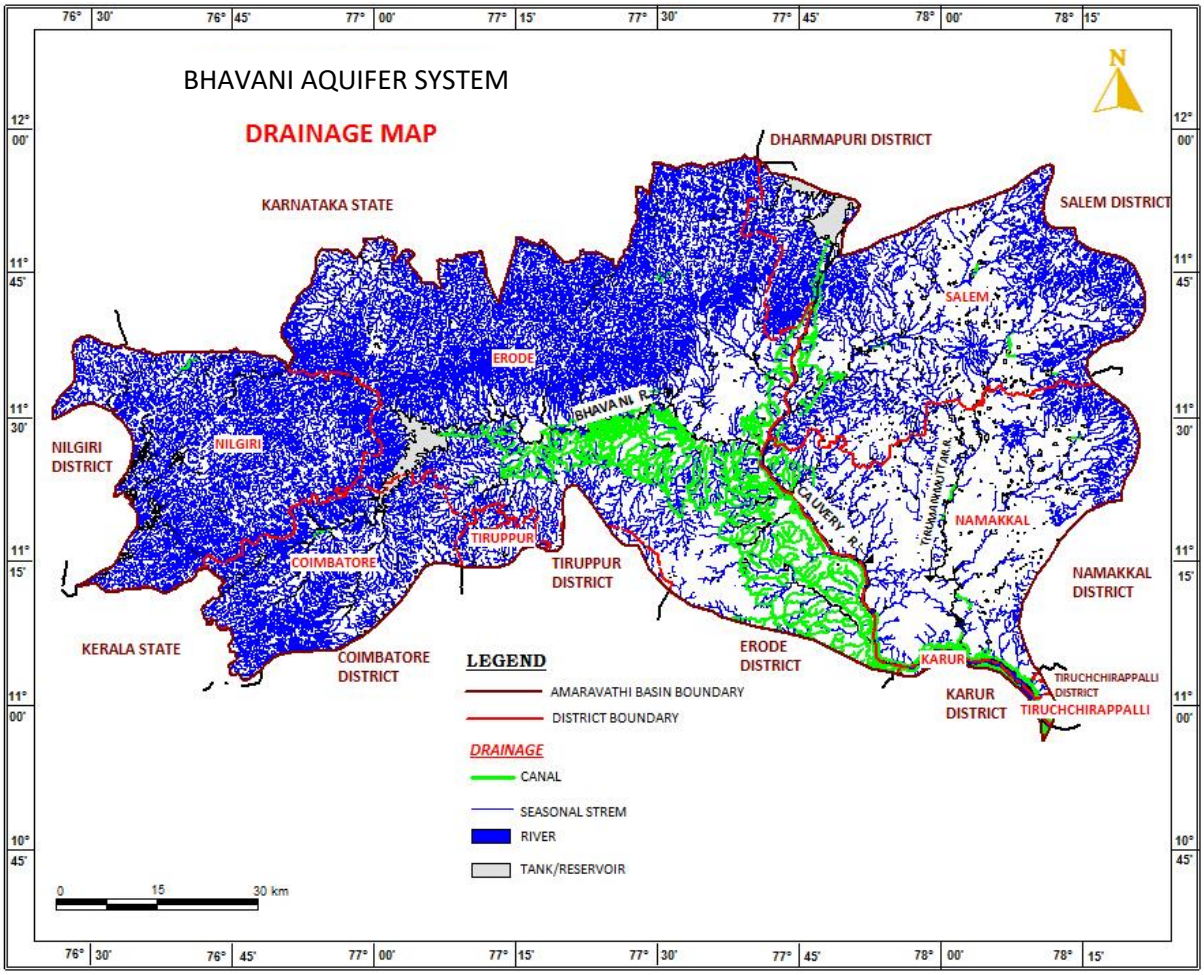
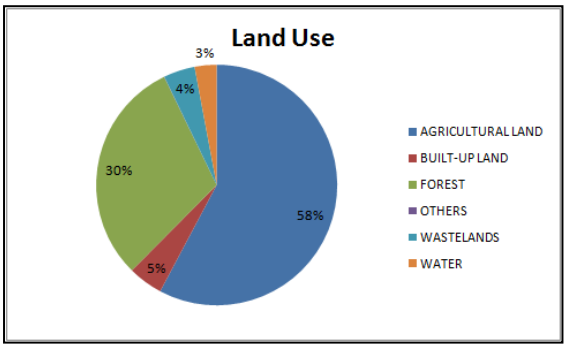
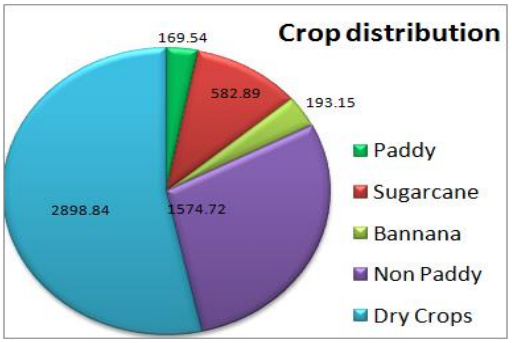


Fig.1.4: Drainage Map of the area

1.8 Agriculture, Irrigation and Cropping Pattern

In the study area, the agriculture and forest are main two landaus and land cover prevailing in the area. the agriculture land is covering about 52 % of the total geographical area of the basin and forest is occupied 30 % of the area. The wasteland, settlement and water bodies are covering less than 5% of the total geographical area of the basin.





The agriculture land is covering 5419.14 sq.km of the total mappable area and represented by 58 % of the total geographical area of the basin. The total 5419.14 sq.km area of the agriculture land are used for taking crops such as paddy, sugar cane, banana, non-paddy and dry crops. The dry crops are taken from 2898.84 sq.km area having 53.49 % of the total agricultural land. The water intensive crops such as paddy, sugar cane and banana are taken from 169.54 sq.km, 582.89 sq.km and 193.89 sq.km respectively. The non-paddy crops are taken from 1574.72 sq.km area having 29.06 % of the crops land. The groundwater is being used to irrigate 2520 sq.km area in the basin but the effective groundwater utilisation is only about 17% of the agricultural land.

In the study area, Left Bhavani Major Irrigation project (Bhavanisagar Dam) is having command area 83769 hec of land (Fig-1.4) with full storage capacity of 2272 m cm. It covers Erode and Trichy districts in Tamil Nadu.

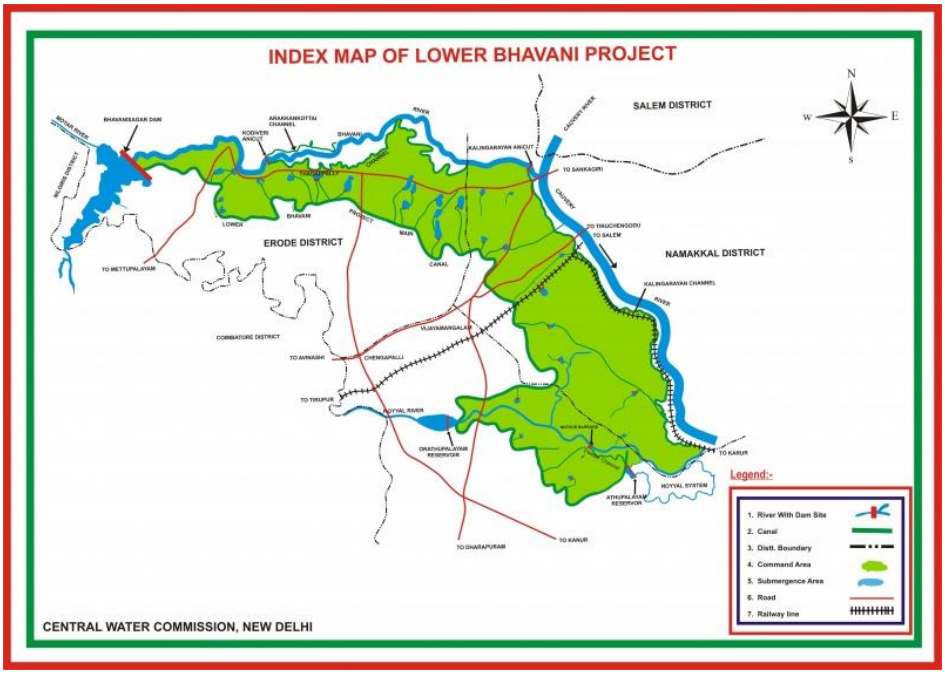


Fig-1.5. Canal command area of LBP

2 DATA COLLECTION AND GENERATION

Hydrogeological data includes quantity and quality from existing data were collected and analysed in GIS platform to validate and avoid discrepancy while preparing the aquifer mapping in the basin. The date collected from allied department such as TWADB, SSGWDC of PWD, Agriculture departments and administrative department were also included in the data collection and analysis.

2.1 Groundwater exploration

The groundwater exploration through drilling of borewell upto the depth of 200m is being carried out by CGWB, SECR to decipher the aquifer depth and its characteristics. The state departments such as TWAD and PWD is drilling the borewell for hydrogeological data and for drinking water purposes. The hydrogeological data generated from drilling were collected and synthesised for demarcating the aquifer system of the basin. As per the data collection in the study area, 146 nos exploratory well drilled before the NAQUIM were collected for aquifer mapping. These wells were plotted and analysed as per the norms of data gap for demarcating aquifers in the area. 56 nos of well were drilled in the area where data gap is found during aquifer mapping. The details of the exploratory well are presented in table-2.1 and the location of the exploratory well are shown in Fig-2.1

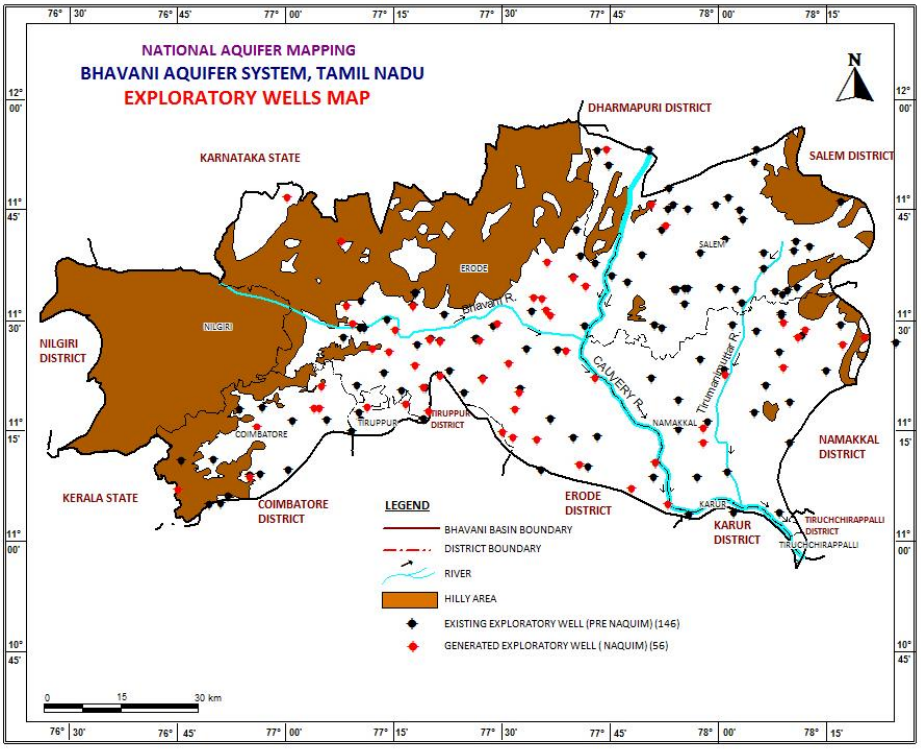


Fig-2.1. Exploratory well location map

2.2 Geophysical Survey

Geophysical survey mainly of Vertical Electrical Sounding (VES) is being carried out to know the sub-surface geology of the area. In CGWB, SECR. the VES was conducted for 200mts depth of investigation using Schlemberger Electrode array. In the study area, as part of the data collection, 279nos VES data was collected and studied the sub-surface geology. The information on sub-surface geology were incorporated with exploratory well data to make the sub-surface geology more accurate to prepare aquifer mapping. The location of VES conducted in the area is shown in Fig-2.2

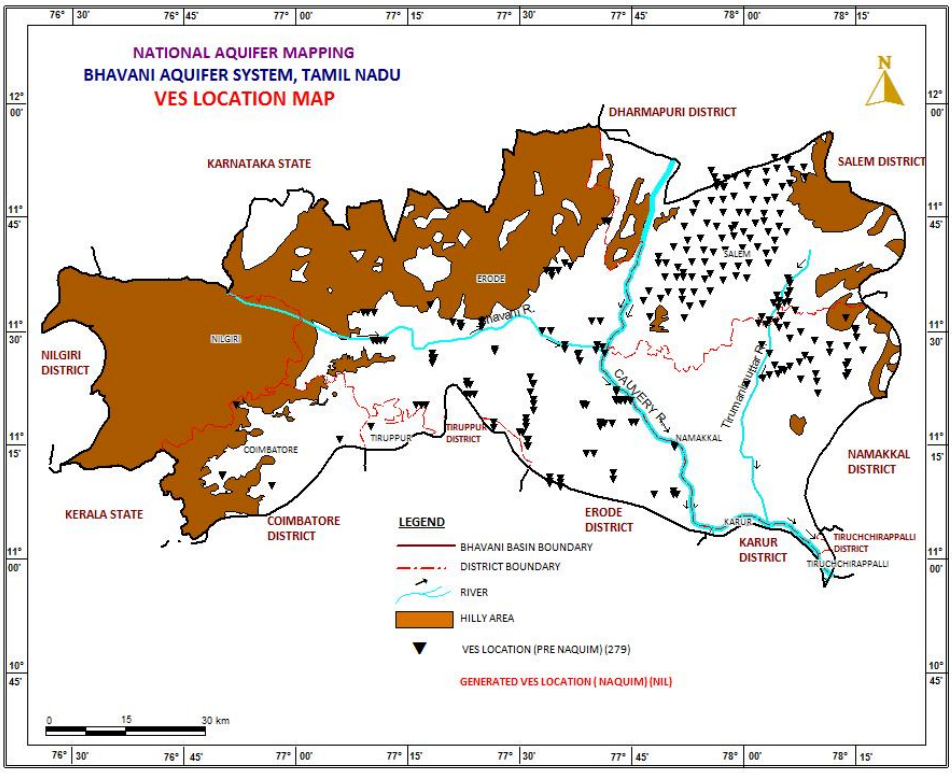


Fig-2.2. VES location map

2.3 Groundwater Level Monitoring Well

Groundwater level monitoring well as observation well was established to monitor the groundwater level four times in a year for shallow aquifer (water table aquifer) and fractured aquifers separately which will give clear picture about the groundwater recharge in aquifer system by CGWB, SECR Chennai. Dug wells which represents water table aquifer are being monitored for water level in the area. The fractured aquifer of water level is also being monitored using the bore well called piezometers. SSGWRDC of PWD and TWAD Board are also monitoring the groundwater level monthly in each district for water table aquifer as well fractured aquifer. The water level data monitored by CGWB and other departments were collected for analysing pre-and post-monsoons water level for aquifer mapping. The data were incorporated for analysing the recharge to groundwater in the study area. In the study area, 292nos of dug well were monitored for water table aquifer and 29nos of piezometer were monitored for fractured well. The groundwater level monitoring well locations are shown in Fig-2.3.

2.4 Groundwater Quality Monitoring Well

Groundwater quality monitoring wells were established by CGWB, SECR, Chennai to monitor the groundwater quality of shallow aquifer once in a year. SSGWRDC of PWD and TWAD Board are also monitoring the groundwater quality of water table aquifer mainly of dug well.in each district. All the groundwater quality data are incorporated for analysing the groundwater quality issues. In the study area, 311nos of well were monitored for groundwater quality. The groundwater quality monitoring well is shown in Fig-2.4.

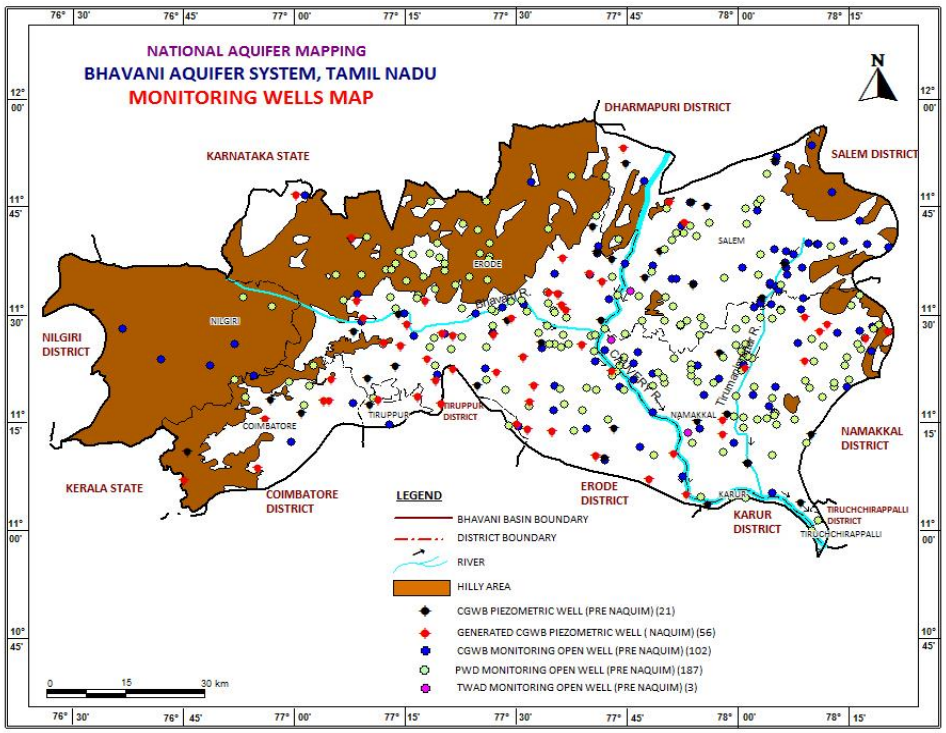


Fig-2.3. Groundwater Level Monitoring well location map

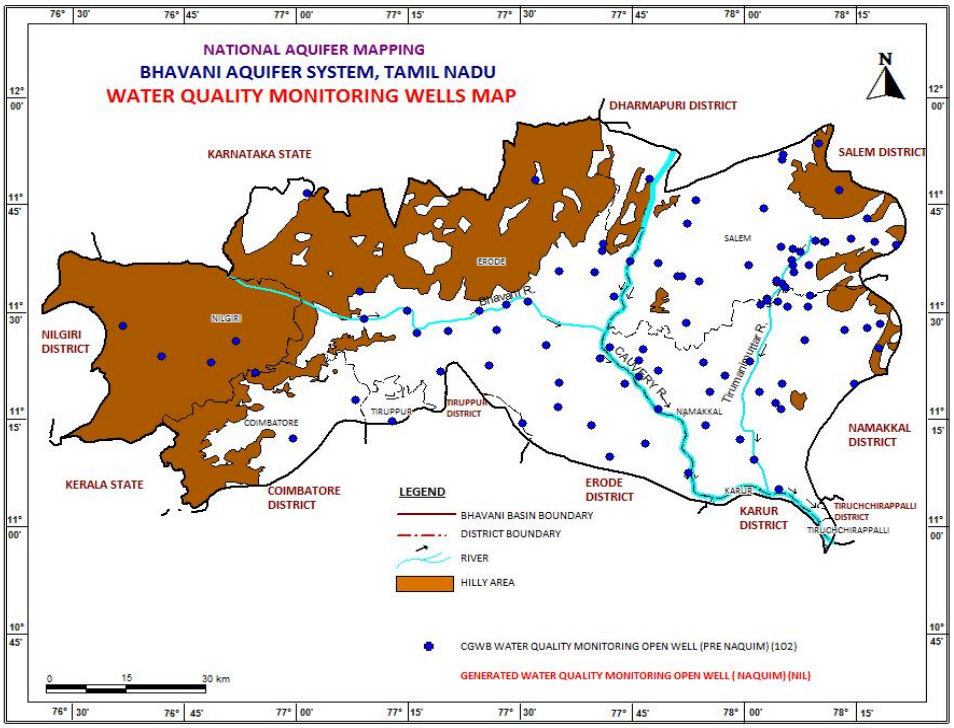


Fig-2.4. Groundwater Quality Monitoring well location map

2.5 Data Generation

Based on the data collected, data adequacy was worked out to decide the scope and extent of further data generation. The data requirement was optimised and decided that the existing hydrogeological data is sufficient to generate the desired outputs of aquifer map and management plan. However, about 56 nos of bore well were drilled and generated data which was used for preparing aquifer mapping in the area. The groundwater management plan, includes supply side and demand side intervention is prepared based on the spatial information such as geology, geomorphology, drainage, surface water body and landuse/ landcover. All spatial information is generated using remote sensing data and digitally recorded in GIS environ. The same has been used to prepare management plan.

2.5.1 Geology

Geologically the area is underlain by the hard-crystalline formation of Archean age. Gneiss, charnockites and acidic rocks/granite are major rocks types occupied predominantly in the study area (Fig-2.5). The granitic / acidic rock occupied in the eastern parts of the study area. The charnockites and granitic/ acidic rocks are emplaced in the gneissic formation. The charnockite is exposed in the western and northern parts of the study area trending NE-SW direction. Other rocks formations are occupied in small area of the basin and not having any significant in aquifer system. Aquifer systems of the area is mainly formed by the gneiss, granite and charnockites of the basin.

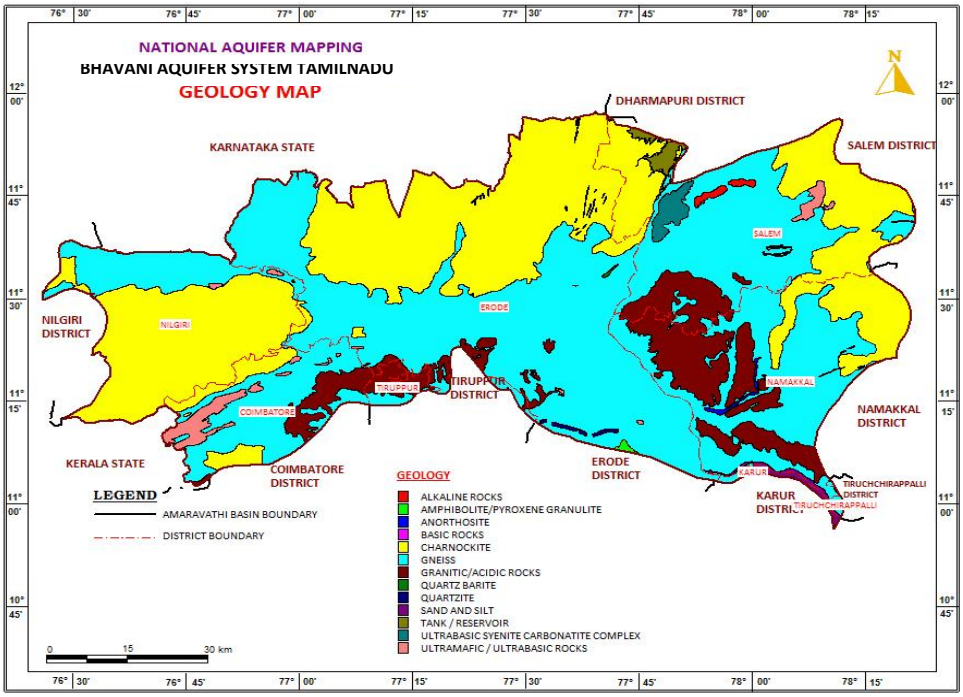


Fig-2.5. Geology map

2.5.2 Geomorphology

The different landforms discernable on the imagery have been broadly classified into Denudational hill, dissected hill and fluvial landforms. The landforms delineated are Hills and plateau, Pediment, pediplain and valley fills (Fig-2.6).

Hills and plateau: Hills and plateau is highly elevated hills prone for dissection and denudation. It devoid or wear very thin soil development. The landforms are un-dissected / less dissected, intermontane valley, structural hill, deflection slope, moderately dissected, highly dissected, denudational / residual hill, structural hill, linear /curvilinear ridge.

Pediment: Pediment is gently undulating rock surface and wears a thin cover of weathered materials. It has been carved over gneissic formation. Pediment zones permit poor infiltration and act as run-off zones, however the fractures, which traverse these zones, could act as good recharge zones. The landforms are bajada, pediment Inselberg complex and dissected / un-dissected plateaus.

Pediplain: This landform is formed by disintegration of county rock. The landforms are pediplain shallow, pediplain moderate and pediplain deep. It is classified on basis of the thickness of the soil development. The pediplain shallow is having thickness of soil ranging from 1-5mts and the pediplain moderate thickness is ranging from 5-10mts. The pediplain deep thickness is more than 10mts. These landforms are formed in the southern parts of the study are.

Valley fill: Valley fill has been developed mainly in the valley portions over charnockite due to deposition of unconsolidated materials by fluvial agencies. The materials are silt, fine sand and at places pebbly. The thickness of fill and weathered zones are ranging from 1 to 15 m and it act as good recharge zone.

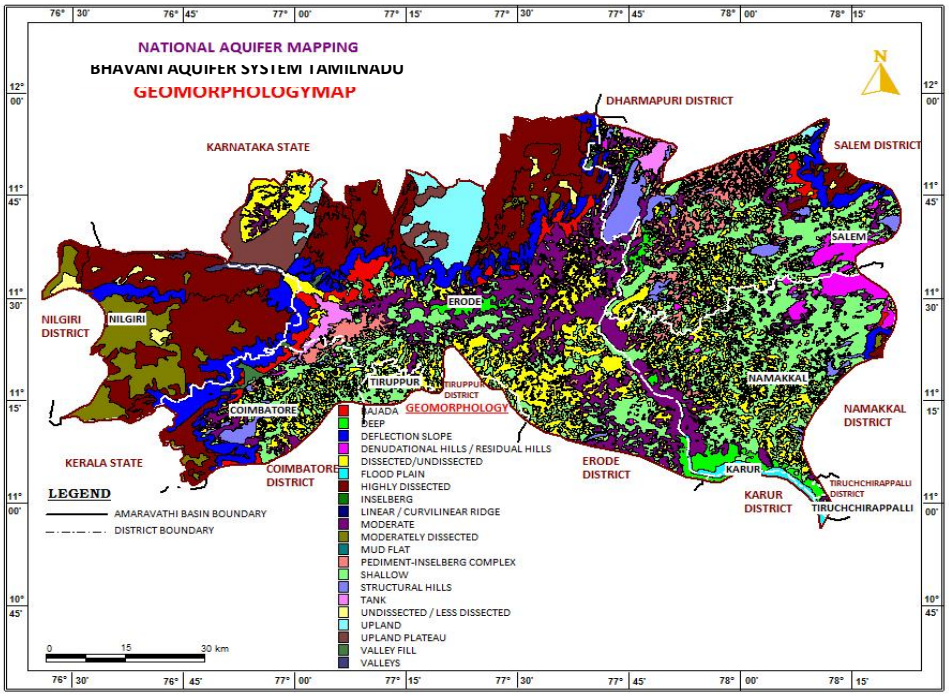


Fig-2.6. Geolomorpholgy map

2.5.3 Landuse /landcover

Landuse / Landcover map was generated using satellite data for the study area. Agriculture land, forest land, waste land, settlement and waterbody are the main landuse/landcover in the area (Fig-2.7). The agriculture land is occurring in the eastern parts of the study area. The forest classes are occurring in the western part of the area.

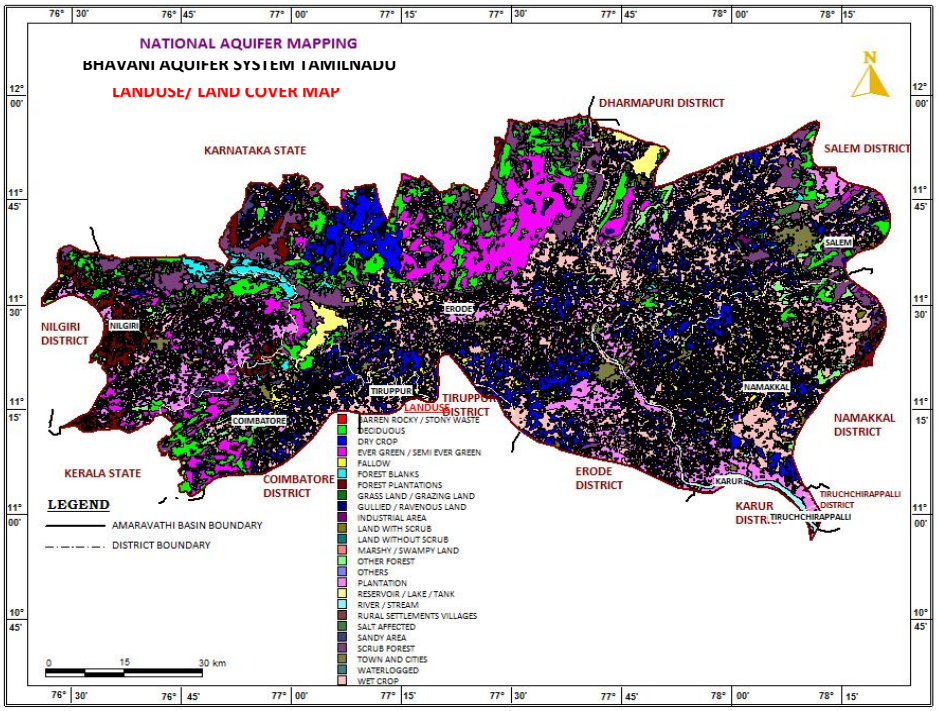


Fig-2.7 Landuse / Landcover map

2.5.4 Soil

Alfisol, Vertisol, Entisol, Inceptisol and Miscellaneous order are soil type mapped in the area (Fig-2.8). Alfisols soils results from weathering process that leach clay minerals and other constituents out of surface layer and in to the sub-soil. They formed primarily under forest or mixed vegetative cover and are productive for most crops. In the study area, it is occupying in the eastern parts of the area. Vertisols are soils of semi-arid humid environment that generally exhibit only moderate degree of soil weathering and development. In the study area, it is covering in very small area. Entisols type occurs in recently deposited parent materials or in area where erosion or deposition rates are faster than the rate of soil development such as dunes, steep slopes and flood plains. They occur in many environments. In the study area, it is found central parts of the area. Inceptosols are soils of semi-arid humid environment that generally exhibit only moderate degree of soil weathering and development. In the study area, it is occupying western and eastern parts of the area. Hill soil found in the western parts of the area.

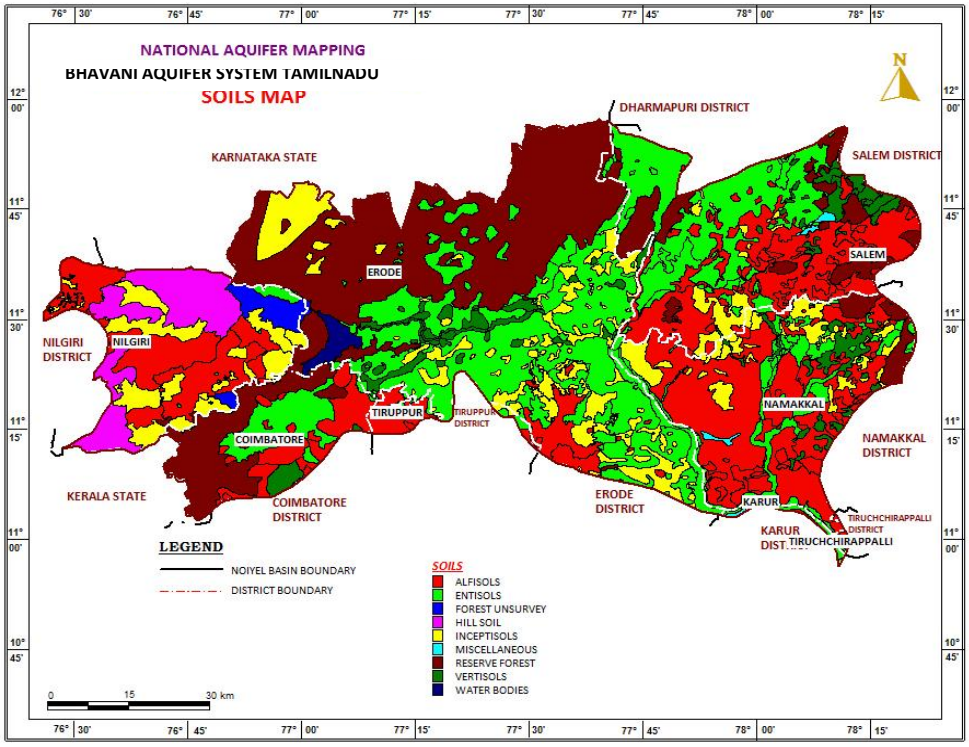


Fig-2.8 Soil map

3 DATA INTERPRETATION, INTEGRATION AND AQUIFER MAPPING

3.1 Hydrogeology

In hard crystalline formation, the groundwater mainly occurs in weathered and fractured rocks. In the study area, Gneiss, Charnockites and Granite / acidic rocks are predominant and forms the aquifer systems (Fig-3.1). Recent alluvium occurring along the river course is contributing to groundwater aquifer systems sporadically. The other rock formations are occupying less area and contribute less to groundwater aquifer systems. The Basic rocks are act as barrier for the groundwater movement and generally trending NE-SW direction. The groundwater occurrences in basic rocks are good in western and northern parts of the basic rocks. The groundwater movement is generally following the general slope of the area particularly in the hilly region and in plain terrain the groundwater flow towards the major river drain in the area. It indicates that the rivers draining in the area are highly influenced by the groundwater systems.

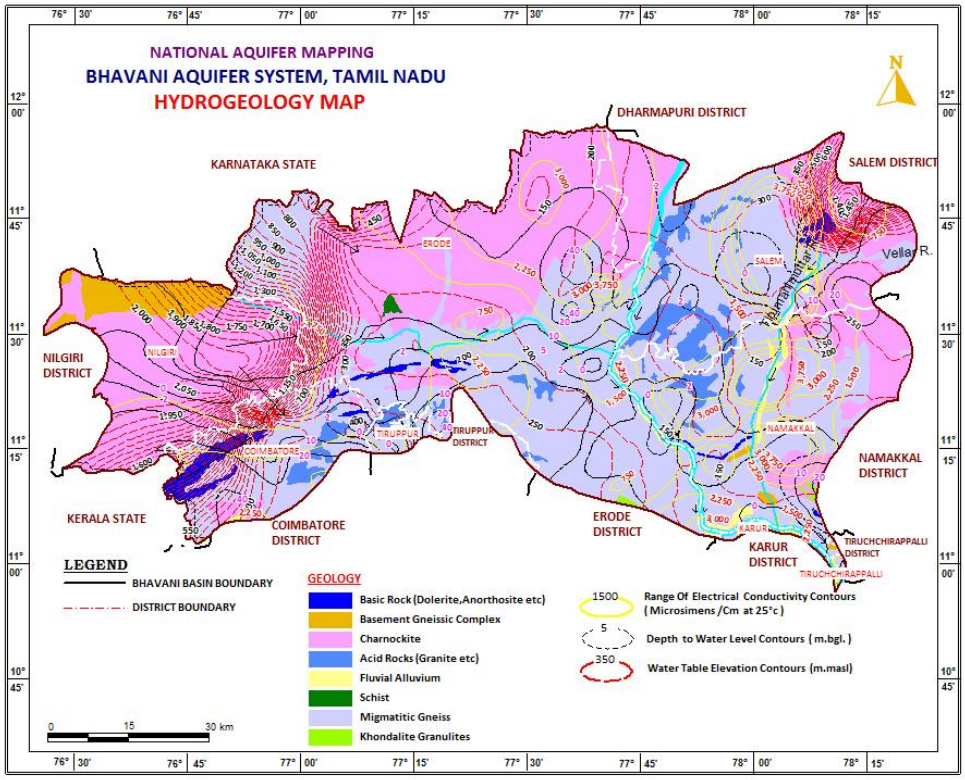


Fig-3.1 Hydrogeology map

3.2 Occurrence of Groundwater in Gneiss

In the study area, gneissic formation is occupying more than 50% of the area and forms main aquifer system in the area. The gneissic formation is occurring in the central and eastern parts of the area. The groundwater generally is occurring in the weathered and fractured rocks. Two types of groundwater abstraction structures such as dug well and bore well are mainly used in this formation. The depth of the dug well is upto 30m bgl and the depth of dug well varies due to surface water sources. The depth of bore well is generally 200m bgl and the fracture are encountered up to the depth of 200mts.

3.3 Occurrence of Groundwater in Charnockites

In the study area, charnockite formation is occupying 40% of the area and forms the aquifer system in the area. It is occurring in the western and eastern parts of the area. It forms hill region in the area, trending NE-SW direction. The groundwater generally is occurring in the weathered and fractured rocks. The groundwater is mainly occurring in the weathered formation and scanty in fractured medium. The groundwater is mainly abstracted by the dug well in the region. The depth of the dug well is upto 20m bgl and it is recharged during the monsoon. Charnockite of this region plays vital role in groundwater recharge as it is covered with thick vegetation cover and receives good to moderate rainfall. It acts as good recharge zone for the aquifer systems and contribute to surface water sources due to base flow during non-monsoon time.

3.4 Occurrence of Groundwater in Granitc /acidic

In the study area, Granite / acidic rock formation occupies in a very small area and forms aquifer systems. It is found mainly in the eastern parts of the study area and contribute less to groundwater systems. The groundwater is mainly occurring in the weathered and fracture formation. Dug well and bore well are groundwater abstraction structure. The depth of dug well is up to 25 m bgl and the depth of the bore well is up to 200m bgl.

3.5 Water level scenario

Monitoring groundwater level of the aquifer systems implies the groundwater recharge to aquifer system and rate of groundwater abstraction in an area. In the study area, groundwater level carried out four times in a year which covers the pre-monsoon and post-monsoon period. The water level data collected from dug well and piezometer representing two aquifer systems are analysed for pre and post monsoon period. The average water level data of May (2006-15) is considered for pre-monsoon and January (2007-16) is considered for post-monsoon water level data. The long-term water level data have been used to describe water level trend of the aquifer system.

3.5.1 Pre-monsoon water level Aquifer-I

Average water level data collected from May-2006 to 15 was analysed for pre-monsoon. The water level data is depicted into five zones such as 0-2, 2-5, 5-10, 10-20 and 20-40 m bgl. Water level of the basin is generally falling in two zones 5 to 10 10 to 20 mts representing 42% and 43% respectively of total well of 129 nos. The deepest water level is 20-40 mts and 4nos of well is showing deepest water level in the area. The details of water level zone of pre and post monsoon are given in table-3.1.

Table: 3.1 Water level zone of Pre and post monsoon data of Aquifer-I

Monsoon	Number & percentage of wells showing depth to water level (m)										Total No of wells analysed.
	0-2		2-5		5-10		10-20		20-40		
	No	%	No	%	No	%	No	%	No	%	No
May (2006-15)	4	3	12	9	54	43	52	42	4	3	129
Jan-16 (2007-16)	7	5	26	20	70	54	26	20	2	1	131

Based on the water level data, water level map has been generated in GIS environ showing five zones of 0-2, 2-5, 5-10, 10-20 and 20-40 m bgl. The maximum area is covered by 5-10 m and 10-20 m bgl. Both the zones are occurring in the gneissic formation. The 10-20 m bgl water level zone is occurring in the uplands of gneissic formation. The deepest zone is occurring in small pockets. The 2-5 m water level zone is found along the Cauvery River mainly in Erode and Namakkal districts (Fig-3.2).

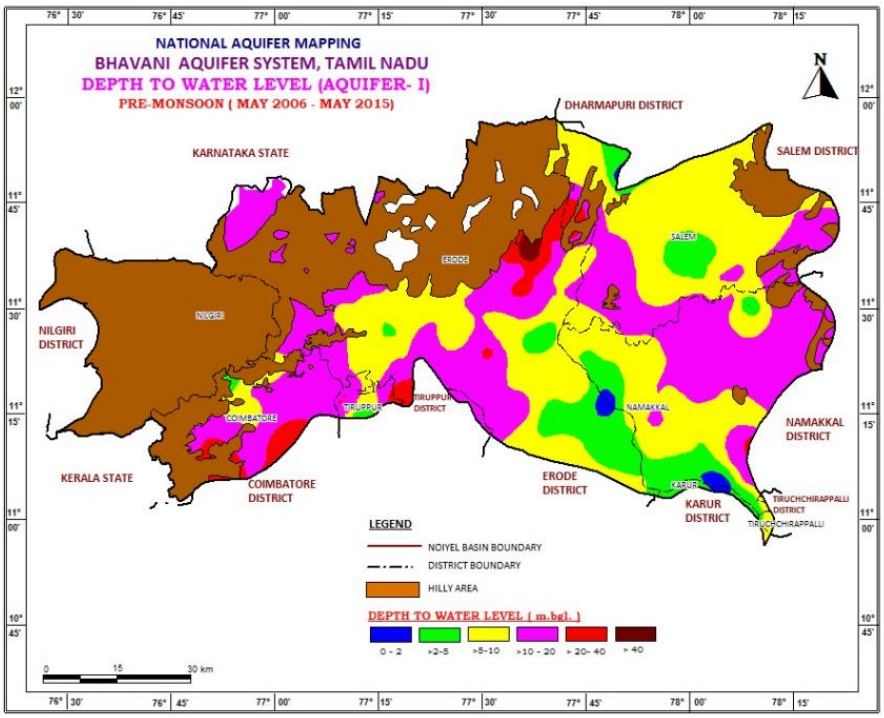


Fig-3.2 Depth to water level zone map (May2006-15) of aquifer -I

3.5.2 Post-Monsoon water level Aquifer-I

Average water level data collected from January-2007 to 16 was taken for post-monsoon. The average water level data is analysed into five zones such as 0-2, 2-5, 5-10, 10-20 and 20-40 m bgl. Average water level of the basin is generally falling in three zones, 2-5,5-10 and 10-20m bgl representing 20%, 54% and 20% respectively of total well of 131 nos. The number of wells falling in 2-5 and 5-10 m bgl zone is increased considerably and decreased in 10-20m bgl water level zone. The deepest water level is 20-40 mts and 2nos of well is showing deepest water level zone in the area. The details of water level zone of pre and post monsoon are given in table-3.1.

Based on the water level data, water level map has been generated in GIS environ showing five zones 0-2, 2-5, 5-10, 10-20 and 20-40 m bgl. The maximum area is covered by 2-5 and 5-10 m and 10-20 m bgl. All three zones are occurring in the gneissic formation. In post monsoon, the 2-5m bgl water level is occurring in all along Cauvery River Course and area is increased considerably. Followed by 5-10 m bgl water level zone is increased than pre-monsoon. The 10-20 m bgl water level zone occurring in the uplands of gneissic formation is reduced than pre-monsoon. The deepest zone is occurring in small pockets and no change is occurring from pre-monsoon to post mon-soon spatially. The 2-5 m water level zone is found along the Cauvery River mainly in Erode, Salem and Namakkal districts (Fig-3.3).

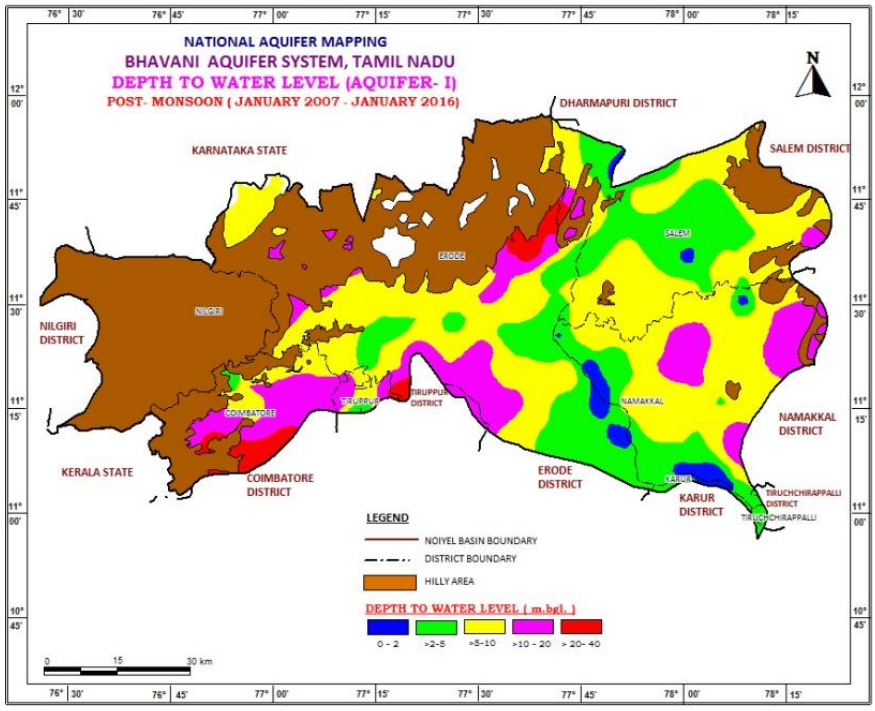


Fig-3.3 Depth to water level zone map (January 2007-16) of Aquifer-I

3.5.3 Pre-monsoon water level aquifer-II

Based on the water level data collected from piezometer for the period between May 2006-15 was analysed and used to describe the water scenario of aquifer-II. The average water level data is analysed into five zones such as 2-5, 5-10, 10-20, 20-40 and > 40 m bgl. Average water level of the basin is falling in four zones 5-10, 10-20, 20-40 and >40 m bgl representing 26%, 33%, 15% and 15% respectively. The deepest water level zone >40 mts is observed in 4nos of well. The water level zone of 10-20m bgl is very prominent and shown by 9 nos well representing 33% of the bore well followed by 5-10 m bgl water level zone which is representing 26% of bore well. The details of water level zones of pre and post monsoon are given in table-3.2.

Table: 3.2 Water level zone of Pre and post monsoon data of aquifer-II

Monsoon	Number & percentage of wells showing depth to Piezometric head (mbgl)												Total No of wells analysed.
	0-2		2-5		5-10		10-20		20-40		>40		
	No	%	No	%	No	%	No	%	No	%	No	%	No
May (2006-15)	0	0	3	11	7	26	**9**	**33**	**4**	**15**	**4**	**15**	**27**
Jan (2007-16)	2	7	3	10	**13**	**43**	**7**	**23**	**2**	**7**	**3**	**10**	**30**

Based on the water level data, water level map has been generated in GIS environ showing five zones of 2-5, 5-10, 10-20, 20-40 and >40 m bgl. The deepest water level zone of >40m bgl is

occupying in two pockets found in northeast and southwest of the area surrounded by the water zone of 40-20 m bgl zone. This is mainly occurring in the uplands of the gneissic terrain. The zone of 5-10m bgl is occurring along the river course found in the southern and south-eastern part of the area (Fig-3.4).

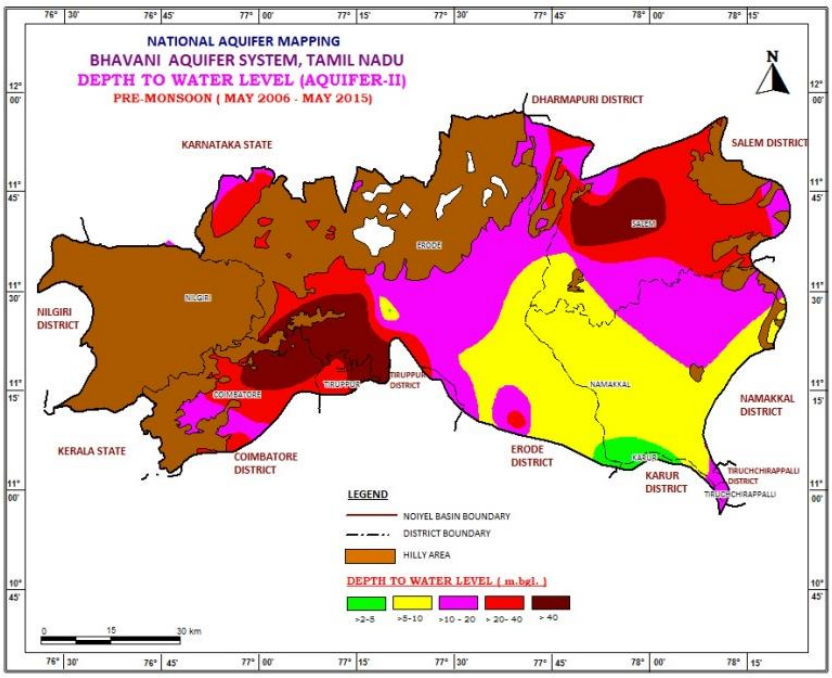


Fig-3.4 Depth to water level zone map (May2006-15) of Aquifer -II

3.5.4 Post-monsoon water level aquifer-II

Based on the average water level data collected from piezometer for the period between January 2007-16 was analysed and used to describe the water scenario of aquifer-II. The average water level data is analysed into six zones such as 0-2, 2-5, 5-10, 10-20, 20-40 and > 40 m bgl. Water level of the basin is generally falling in four zones 5-10, 10-20, 20-40 and >40 m bgl representing 43%, 23%, 7% and 10% respectively of total well of 30nos. The deepest water level >40 mts is observed in 3nos of well. The water level zone of 10-20m bgl is very prominent having 9 nos well representing 33% of the bore well followed by 5-10 m bgl water level zone having 26% of bore well. The water level zones of The details of water level zone of pre and post monsoon are given in table-3.2.

Based on the average water level data, water level map has been generated in GIS environ showing six zones of 0-2, 2-5, 5-10, 10-20, 20-40 and >40 m bgl. The deepest water level zone of >40m bgl is occupying in two pockets found in northeast and southwest of the area surrounded by the water zone of 40-20 m bgl zone. This is mainly occurring in the uplands of the gneissic terrain. The zone of 2-5m bgl is occurring along the river course found in the southern and south-eastern part of the area and the area of 5-10m bgl is increased than pre monsoon water level zone (Fig-3.5). 0-2 water level zone is occurring in southern tip of the area indicating the waterlogging conditions. The area which is falling in 5-10 water level of pre monsoon is occupied by 2-5 water level zone of post monsoon. It indicates that the groundwater recharge in the shallow fracture is faster than deeper fracture.

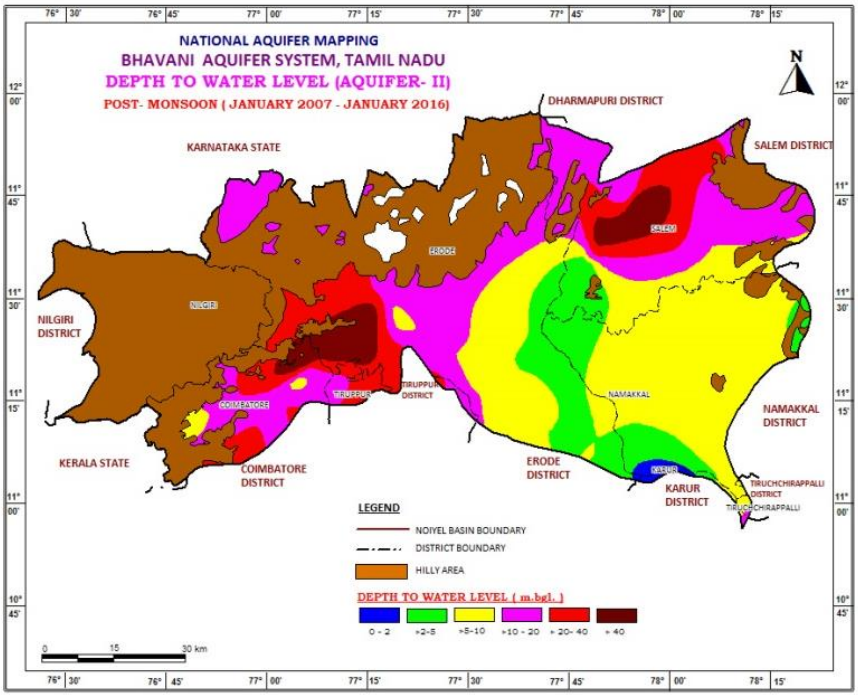


Fig-3.5 Depth to water level zone map (January 2007-16) of aquifer-II

3.6 Groundwater quality

The groundwater samples were collected from 311 dug wells and analysed pH, EC, anion, cation and fluoride and nitrate concentrations. The EC of groundwater is discussed in the report. 42% of the sample is showing EC between 750-2250 µS/cm at 25 °C which is considered as moderately fresh water. More than 50% of the sample is falling EC of 2250 - >3000 µS/cm at 25 °C which is showing the groundwater is high concentration mineralisation. Only less than 10% of sample is showing the EC less than 750 µS/cm at 25 °C and this groundwater is considered as fresh (Table-3.3).

The EC data is represented spatially in Fig-3.6 and it is showing EC into four zones such as 0-750, 750-2250, 2250-3000 and >3000 µS/cm at 25 °C. The maximum area is falling under EC between 750-2250 µS/cm at 25 °C and < 750 µS/cm at 25 °C is occurring in the western parts of the area. The EC between 2250 - >3000 µS/cm at 25 °C is falling in the eastern parts of the area where upland of the gneiss and granite formation is exposed. The high mineralisation is found in the eastern parts of the area and it indicates that high concentration of chemical constituents presents in the water. It may be due to high concentration of fluoride in the groundwater.

Table-3.3 EC of groundwater

EC (µS/cm at 25º C)	**Water Class**	**Percentage of Samples**
0-750	Fresh	**10%**
750 – 2250	Moderately Fresh	**42%**
2250 – 3000	Slightly mineralized	**25%**
>3000	Highly mineralized	**23%**

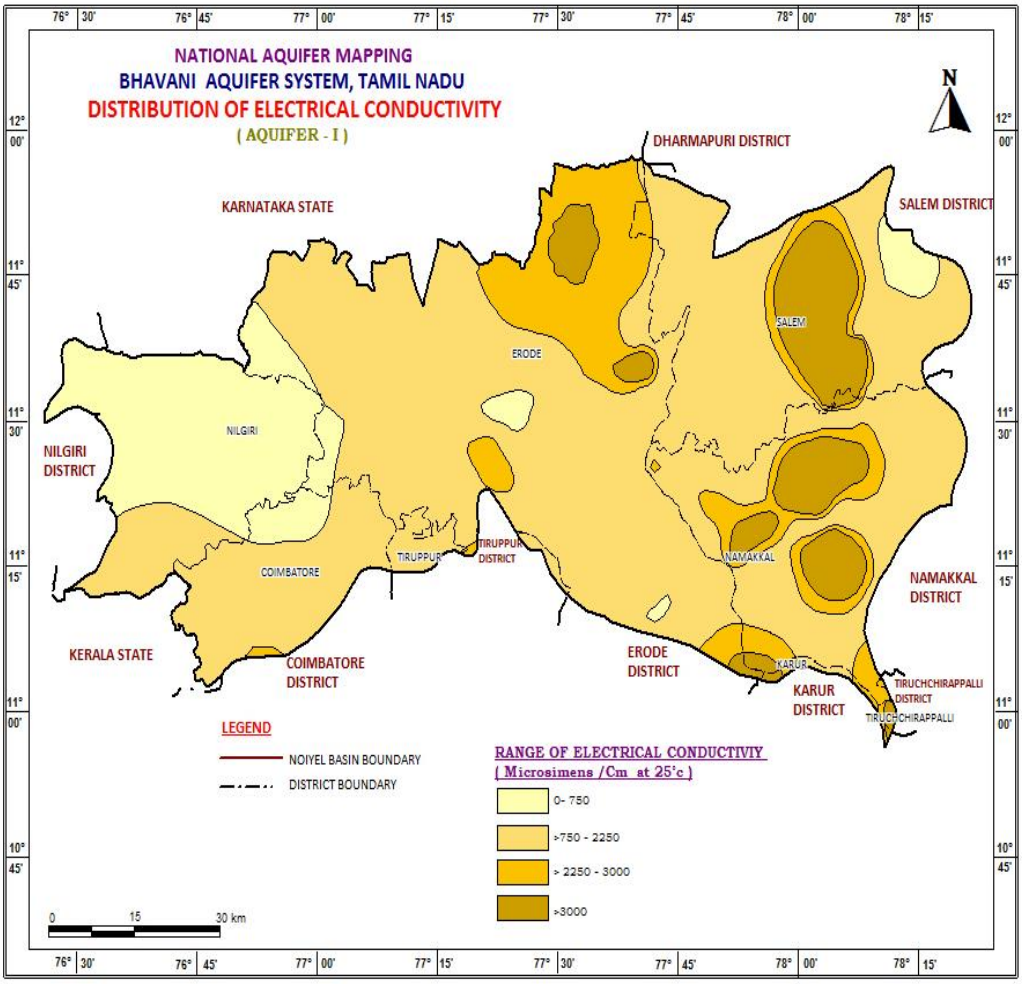


Fig-3.6 Spatial distribution of EC in groundwater

3.7 Aquifer Disposition

The aquifer disposition of the area is demarcated based on sub-surface geology which depicts the lateral and vertical configuration of the aquifers using Rockworks software. In the study area, two aquifer systems have been demarcated based on the groundwater water occurrence and movement. The first aquifer (Aquifer-I) is weathered layer of all three lithology such as gneiss, granite and charnockite formation. The second aquifer (Aquifer-II) is fractured layers of all three lithology such as gneiss, granite and charnockite formation. The bottom of the aquifer-II is demarcated using the lower most fractured depth encountered in the bore well. The aquifer demarcation of the area is depicted in 2D and 3D view.

3.8 2D Aquifer disposition (Hydrogeological cross section)

In the study area, hydrogeological cross sections were prepared across and along basin to know the vertical and lateral extension of the basin aquifer system. Four hydrogeological cross sections were prepared across the basin aquifer systems. Three hydrogeological section along the aquifer basin were prepared for the study area.

3.8.1 Hydrogeological cross section Across aquifer basin

The hydrogeological cross section across the aquifer basin is shown in Fig- 3.7 to 3.10. It indicates that the vertical and lateral extension of fractured aquifer is uniform in gneiss formation. The vertical extension is low in charnokites and granite rock formation. The high vertical extension is observed at contact between charnokites/ gneiss formation. The high thickness of fractured aquifer is observed in northern parts of the area (fig-3.7). The Uniform thickness is observed in the mono lithology i.e gneissic formation (fig-3.8) and (fig 3.9). The section (fig-3.10) is also showing high vertical extension at contact between gneiss/charnokites/granites.

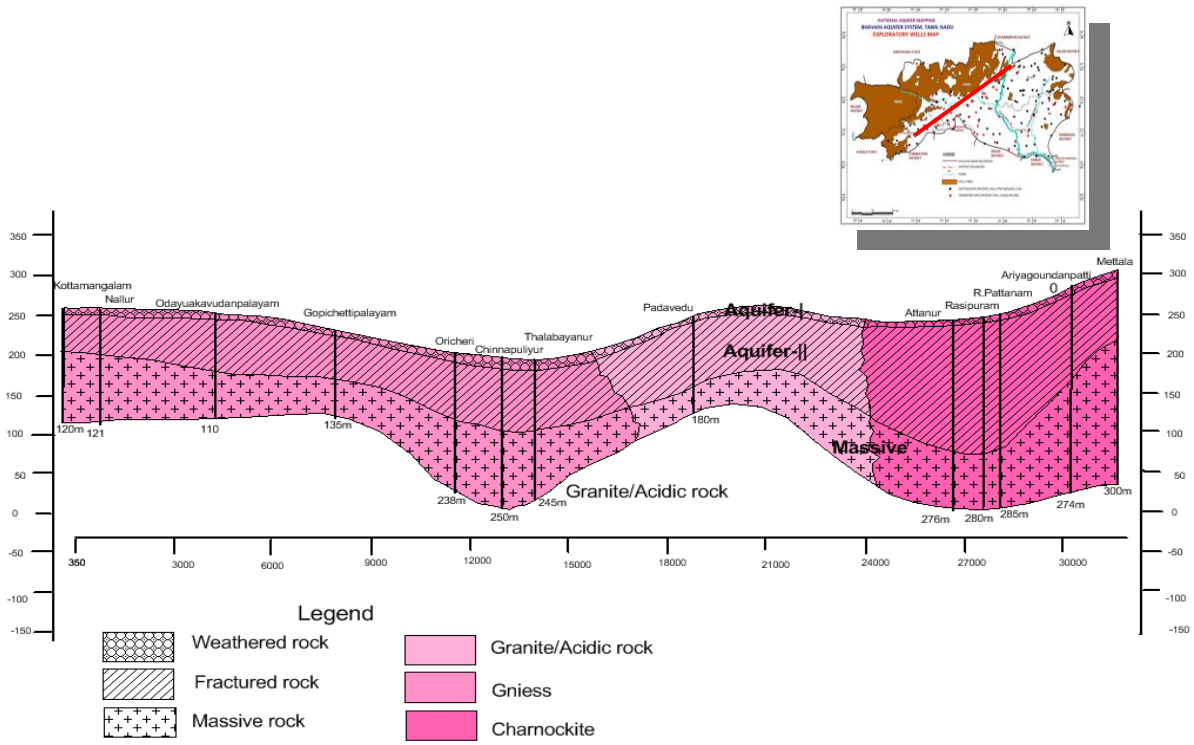
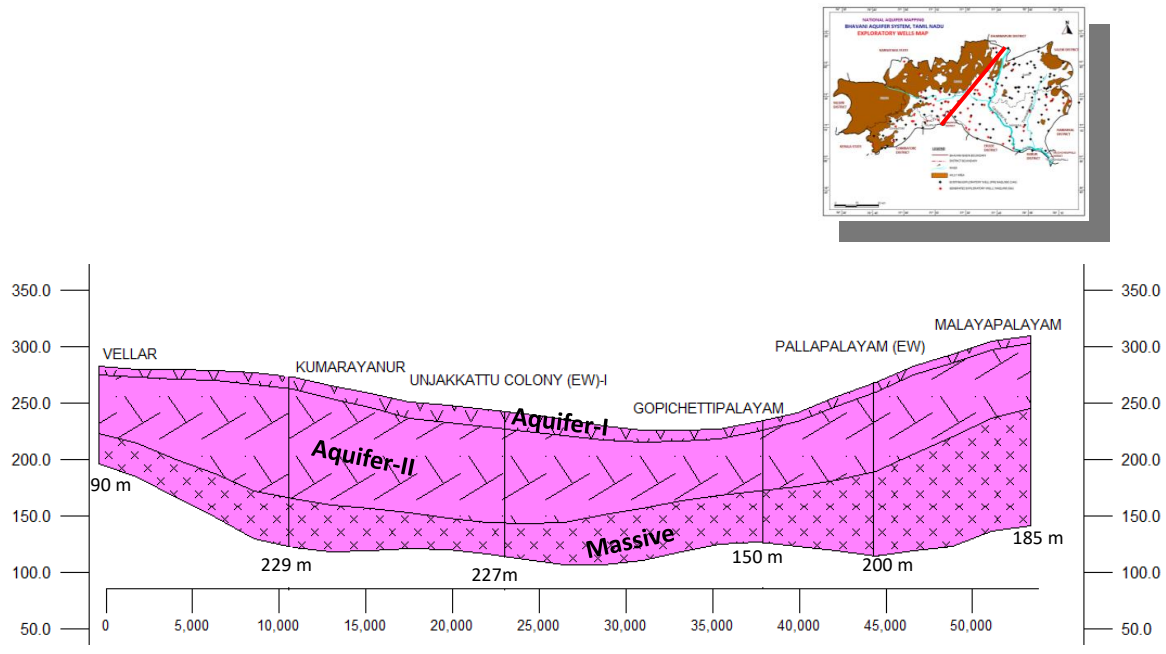
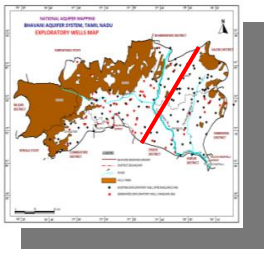


Fig-3.7 & 3.8 Hydrogeological cross section





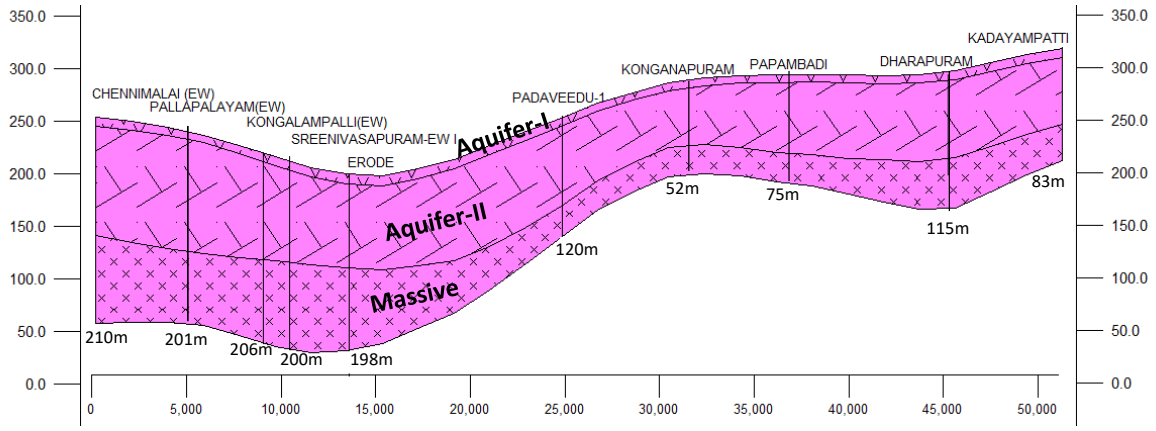
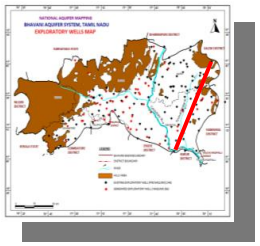


Fig-3.9 Hydrogeological cross section



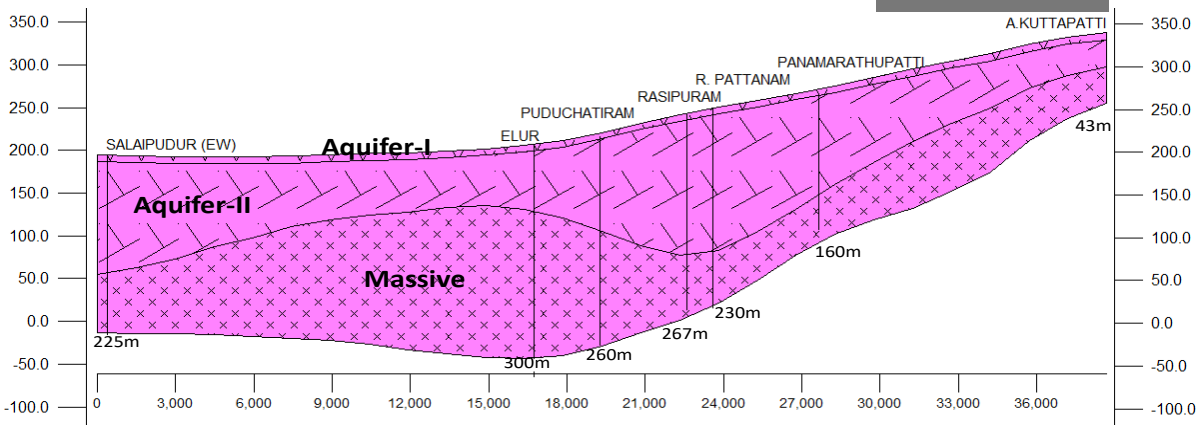


Fig-3.10 Hydrogeological cross section

3.8.2 Hydrogeological cross section along aquifer basin

The hydrogeological cross section along the aquifer basin is shown in Fig- 3.11 to 3.13. It indicates that the thickness of fractured aquifer is more in eastern part of the study area and uniform in other areas. The fractured aquifer is almost following the general topography of the terrain.

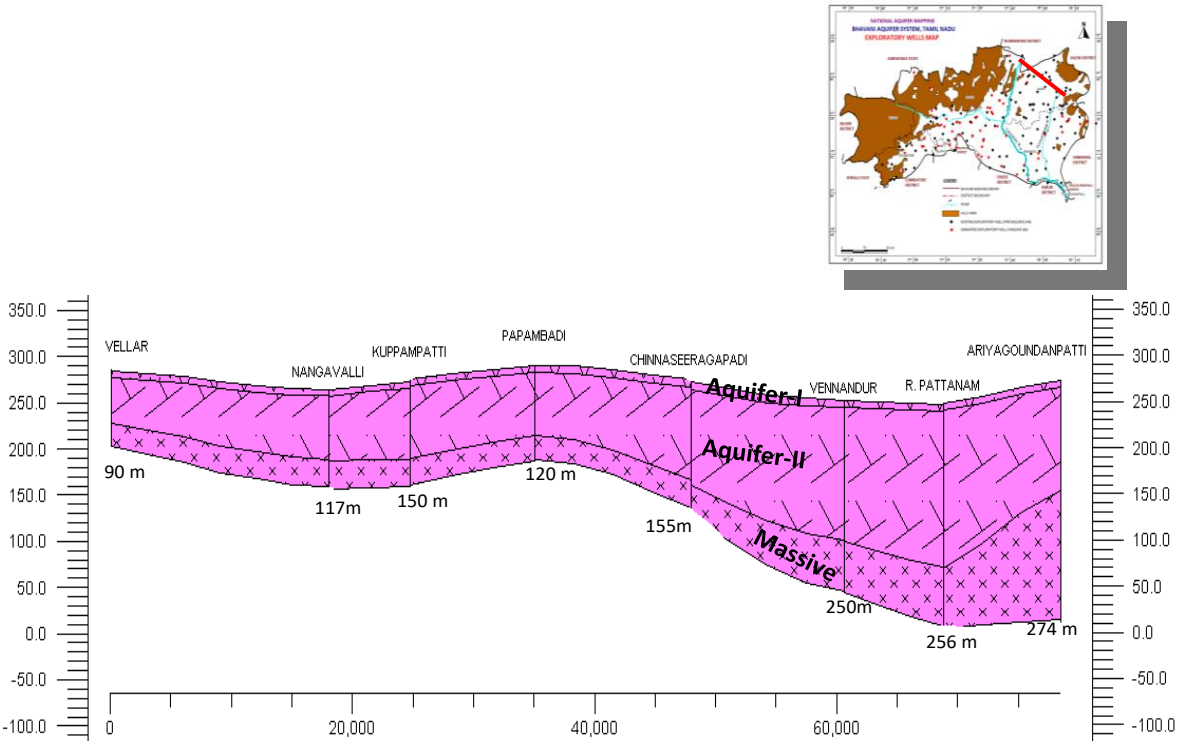
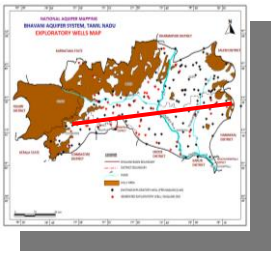
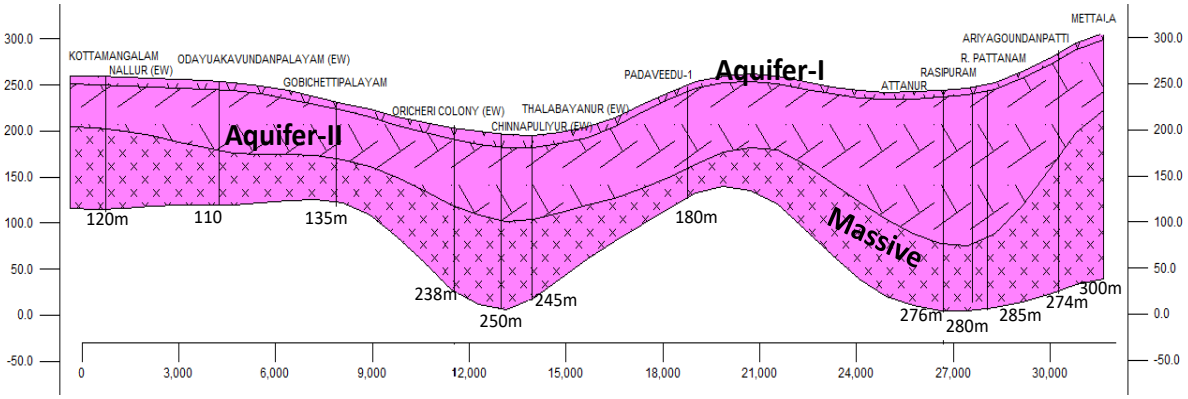
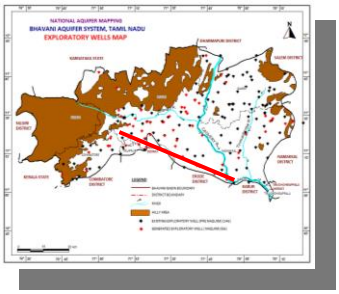


Fig-3.11 & 3.12 Hydrogeological cross sections







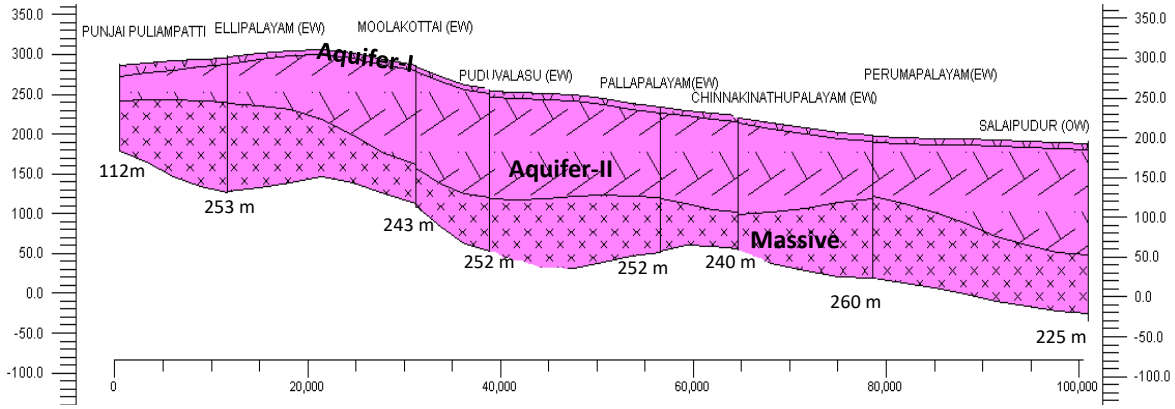


Fig-3.13 Hydrogeological cross section

The sections (fig-3.11 and 3.12) reveals that when aquifer traversing in two different lithology such as gneiss and charnokites, the vertical extension is high and it is very well showing at the contact between gneiss and charnokites. It is generally occurring in the east of the basin and as well west of the basin. The section (fig3.13) is indicating that the aquifer traversing in single lithology and having the uniform vertical extension.

3.9 3D Aquifer disposition

Fence diagram of the aquifer system of the basin was prepared and shown in Fig-3.14. The thickness of the Aquifer-I is almost same in the aquifer basin. The thickness of the aquifer-II is not uniform in thickness. The thickness of the Aquifer-II is high occurring at NW and SE parts of the aquifer basin. Aquifer-II is extending latterly in uniform thickness and it fallow the general topography of the area. Low thickness is indicating the shallow fracture depth and high thickness is indicating depth of occurrences of fracture at much deeper level. This indicates that the shallow fractures can be recharged faster than deeper fracture in the area. The recharging of deeper aquifer is mainly depending upon the amount of water available for groundwater recharge.

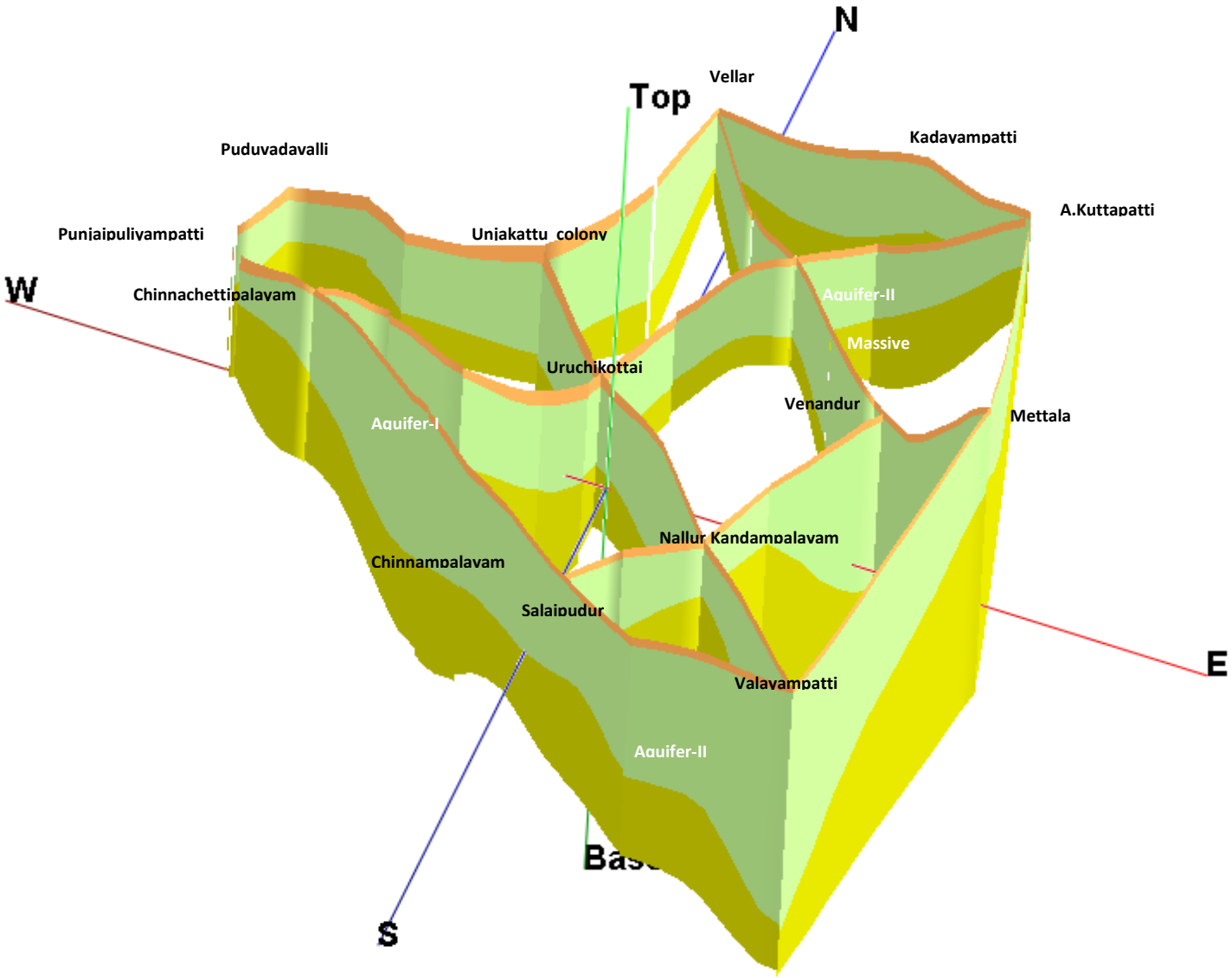


Fig-3.14 3D view of Aquifer Systems

3.10 Thickness of Aquifer-I

Thickness of the Aquifer-I was prepared based on the weathered thickness and shallow fracture depth which has connectivity with the weathered mantle. The bottom depth of the weathered/shallow layer is considered as thickness of the Aquifer-I and shown in Fig- 3.15. The thickness of Aquifer-I is depicted spatially with 5m contour intervals (0->30m). The maximum area of the basin is occupied by 15 – 20 m thickness followed by 10-15 m aquifer thickness. The thickness of 10-15 m thickness is mainly occurring in the uplands of gneissic formation. The thickness between 20-25m of Aquifer-I is found in northern parts of the study area. The thickness of more than 25 m is

found southwestern parts of the study area. The thickness of Aquifer-I is directly indicating the groundwater storage in the aquifer.

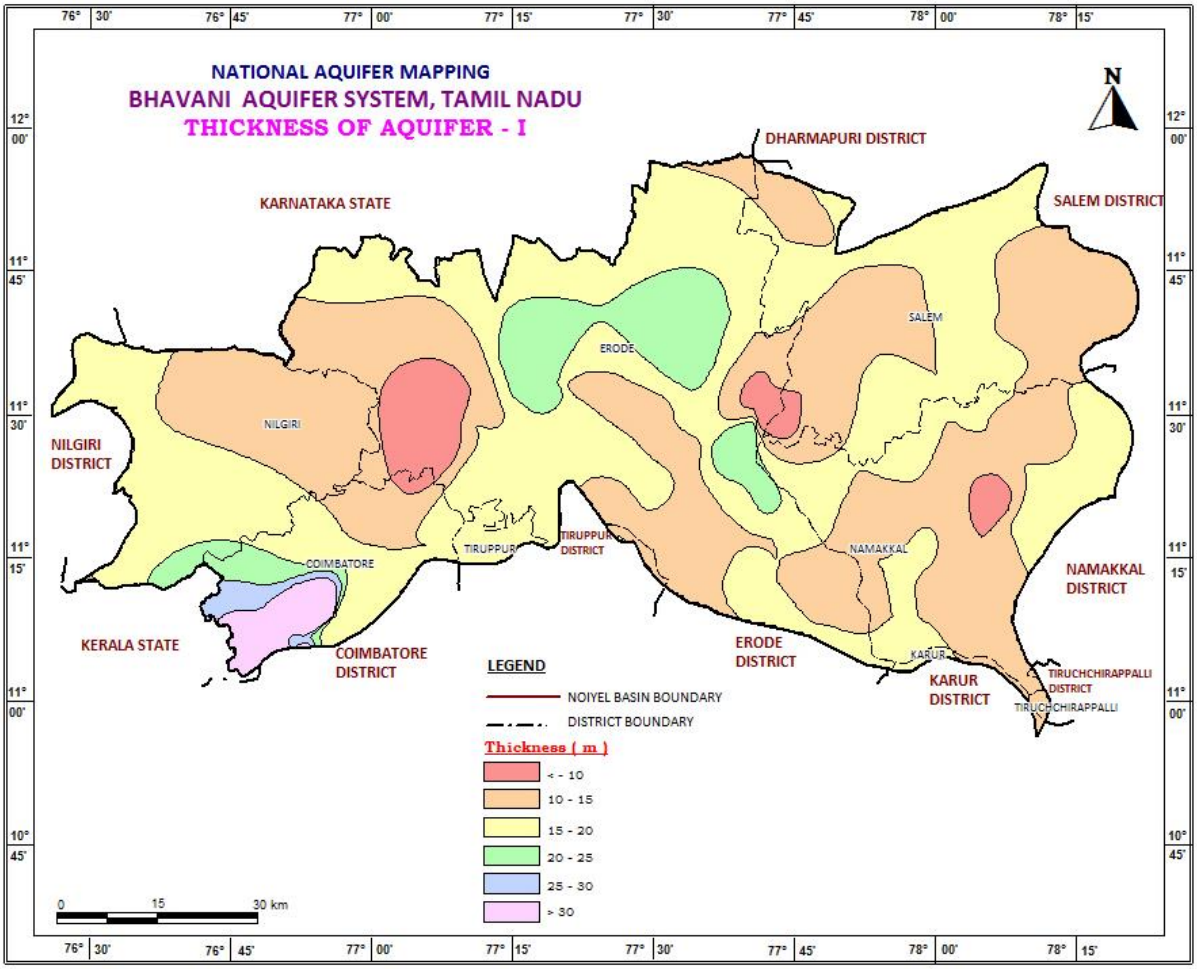


Fig-3.15 Thickness of Aquifer-I

3.11 Depth of occurrence of Aquifer-II

Based on the last fracture depth encountered in bore well, the depth of occurrence of aquifer-II was prepared for basin aquifer system and presented in Fig-3.16. Most of the area, the depth of occurrence of the aquifer-II is between 50-100 m and found in the eastern and western parts of the study area followed by 100-150 m occurring in the eastern parts of the study area. The depth of occurrence of aquifer-II above 150m is a small pocket and found in the central parts of the study area. More than 50 % of the well is showing fracture less than 100 m. It is indicating that 50-100mt fracture occurrences are found to be suitable for groundwater recharge and developments as it is having very good interconnection with aquifer-I (weathered mantle) and the depth of occurrence of aquifer -II (100-150mts) is generally potential for groundwater developments. The map is also indicating that the fracture occurring below 150-200mts at the contact between the gneiss/ charnokite/granites.

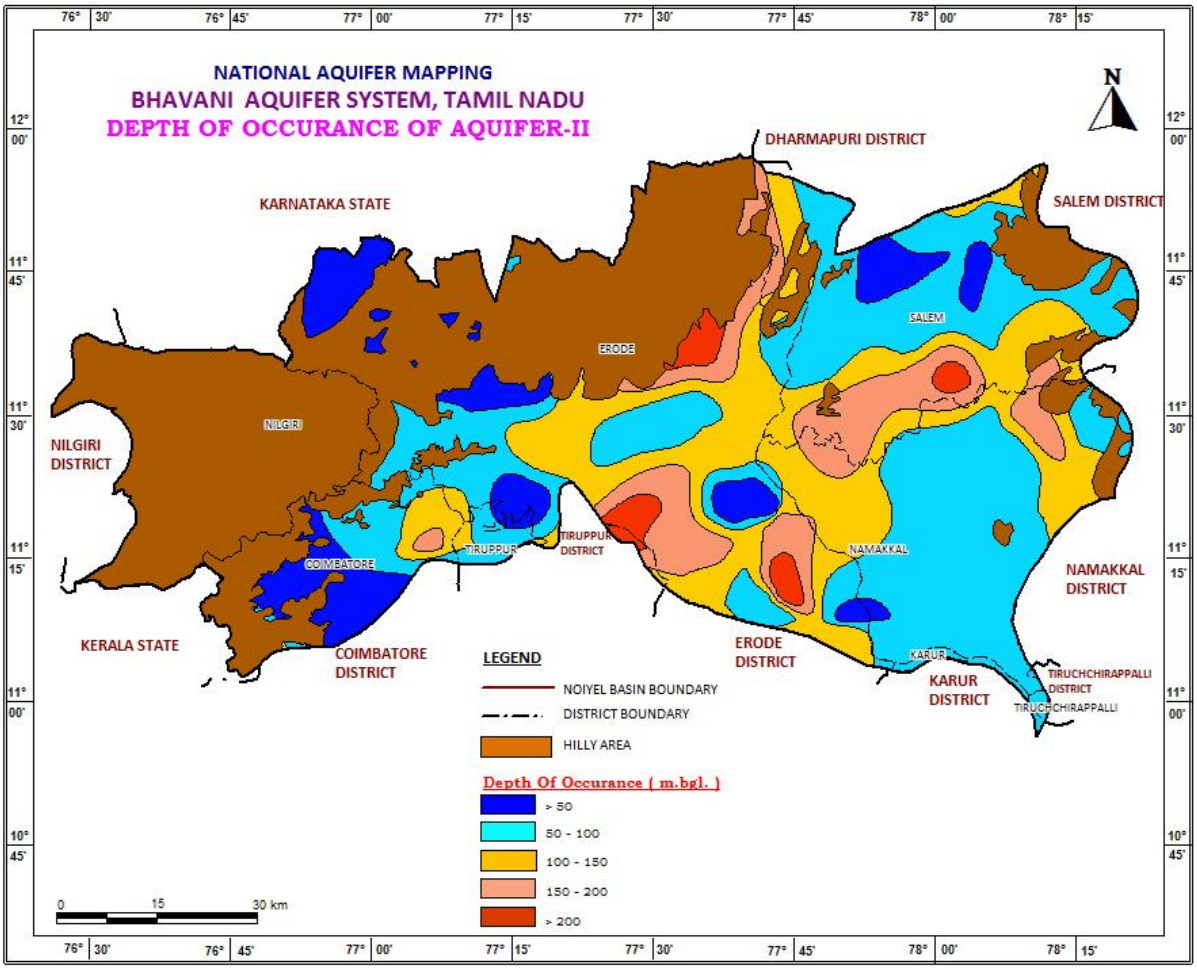


Fig-3.16 Depth of occurrence of Aquifer-II

3.12 Aquifer Characteristics

Based on the aquifer configuration and characteristics, two aquifer systems such as Aquifer –I & II have been demarcated for the basin aquifers. The hydraulic characteristic is main parameter to demarcate the aquifer system in the area.

3.12.1 Aquifer-I

The weathered layer of the all three lithology such as gneiss, charnockites and granite is considered for the Aquifer-I. In general, the thickness of the aquifer is ranging from 7 to 38 mts with an average thickness of 18mts. The discharge of the aquifer- I is ranging from 15 to 20 m^3/hrs which sustain for 2 -5 hrs during monsoon period whereas in summer period < 1 to 2 hrs of pumping for groundwater utilisation. Based on the long duration pumping test, the transmissivity of the aquifer is determined and it is ranging from 5 to 26 m^2/day. Total Dissolved Solution (TDS) is ranging from 150 to 4670 µs/cm and in and around the industrial area, the TDS is upto 20,000 µs/cm. The groundwater is found suitable except at industrial areas.

3.12.2 Aquifer-I I

The occurrence of fracture in all three lithology such as gneiss, charnockites and granite is considered for the Aquifer-II. In general, the thickness of the aquifer is ranging from 10 to 200 mts depending upon the occurrence of fracture upto 200mts depth. The groundwater discharge of the fracture encountered in 2 to 5 times of fracture is ranging from 2 to 15 m^3/hrs. Based on the long duration pumping test, the transmissivity of the aquifer is determined and it is ranging from 1 to 80m^2/day. The groundwater in this aquifer is contaminated with geogenic origin such as fluoride and nitrate.

4.0 GROUNDWATER RESOURCES

The groundwater resource of Aquifer-I was estimated as on March - 13 with assessment unit of Firka, smallest administrative unit of revenue division of Tamil Nadu. The estimated Firka groundwater resources have been apportioned for the district falls in the basin aquifer system. The groundwater resource of Bhavani River basin aquifer system was estimated based on GEC-1997 methodology. The recharge of groundwater was estimated for command and non-command area separately and added together for discussion purposes.

4.1 Groundwater Resources

Based on the groundwater resources estimation, the net groundwater availability of the area is 135001.75 HAM (Table 4.1). The groundwater draft for irrigation is 120491.61 which is 90% of the total availability and the groundwater draft due to domestic and industry is 11823.90HAM. The existing groundwater draft from all purposes is 132315.52HAM. The stage of groundwater development of the aquifer systems is 98.01%. Based on the stage of groundwater development, Firka has been categorised into safe (>70%), semi-critical (70-90%), Critical (90-100%) and over-exploited (100<) in the aquifer system. The eastern part of the area is mainly showing as over exploited category where the groundwater utilisation for irrigation purposes is high and the semi-critical and safe category is falling where the irrigation is being carried out through surface water sources (Fig 4.1).

Table 4.1 The details of Groundwater Resources

District	Area in sq.km	Net Annual Ground Water Availability (HAM)	Existing Gross Ground Water Draft for Irrigation (HAM)	Existing Gross Ground Water Draft for domestic and industrial water supply (HAM)	Existing Gross Ground Water Draft for All uses (HAM) (11+12)	Stage of Ground Water Development {(13/10)*100} %
Coimbatore	**767**	7896.64	7235.84	526.37	7762.21	98.30
Erode	**3187**	62671.05	52366.08	5902.10	58268.18	92.97
Namakkal	**49**	24906.59	28252.07	1672.72	29924.79	120.15
Salem	**2272**	29350.83	29269.53	3269.10	32538.62	110.86
The Nilgiris	**1972**	7251.58	546.00	335.93	881.93	12.16
Trirchirapalli	**1962**	1358.10	1355.90	44.39	1400.29	103.11
Tiruppur	**182**	1566.95	1466.20	73.29	1539.49	98.25
TOTAL	**10391**	**135001.73**	**120491.61**	**11823.90**	**132315.52**	**98.01**

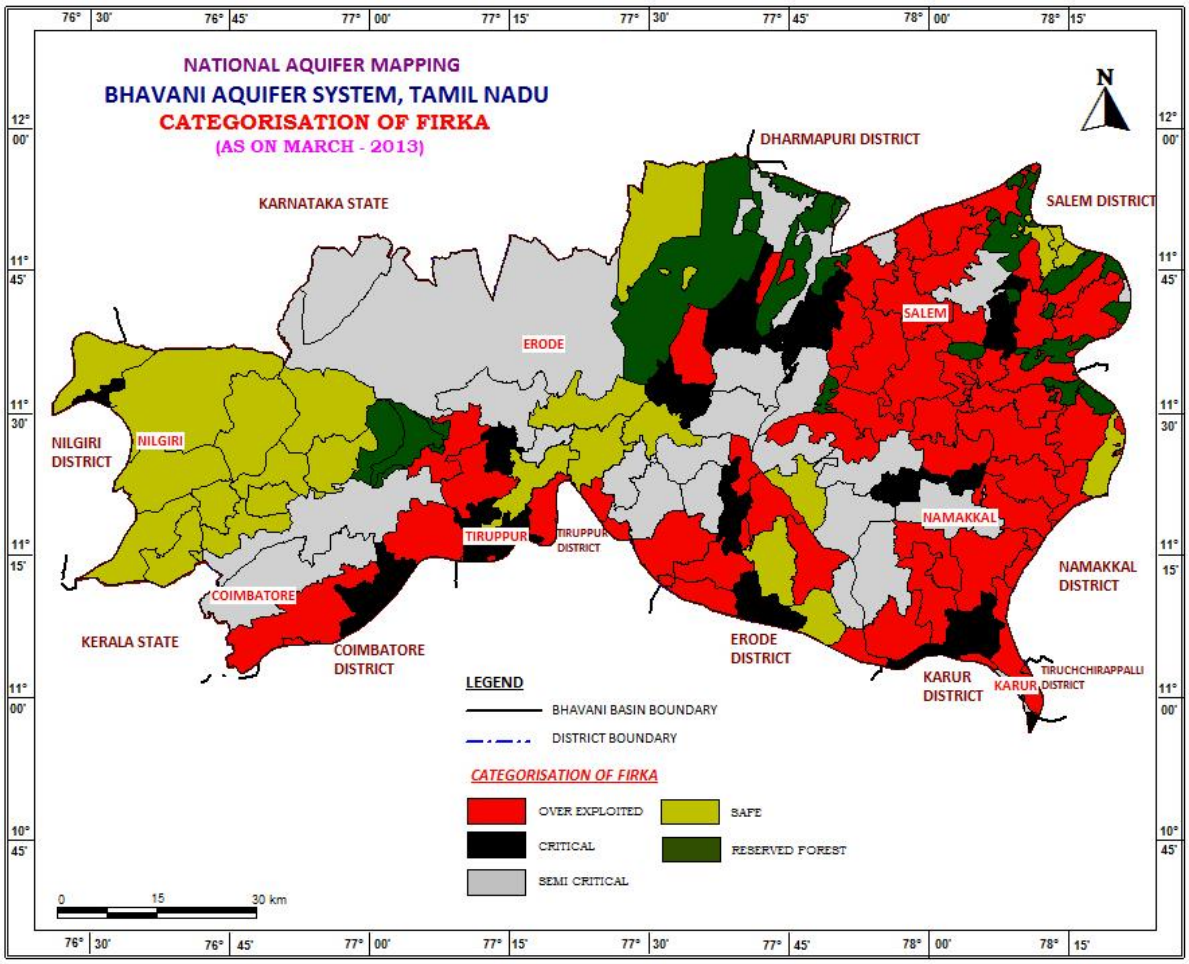


Fig-4.1 Groundwater Resources categorisation

4.2 Stage of Groundwater development

Groundwater resources categorisation of 52 nos of Firka are falling in critical and over-exploitation category out of 95 nos of Firka. In Erode district, out of 31nos firka, 15 nos Firkas are falling in critical and over-exploitation category. In Namakkal District, out of 22nos of Firkas, 15 nos Firkas are falling in critical and over-exploitation category. In Salem district, out of 25 nos of Firka, 19 nos of Firka are falling in critical and over-exploitation category (Table – 4.2). Other districts are not having much area in the basin

Table 4.2 Firka wise Groundwater categorisation

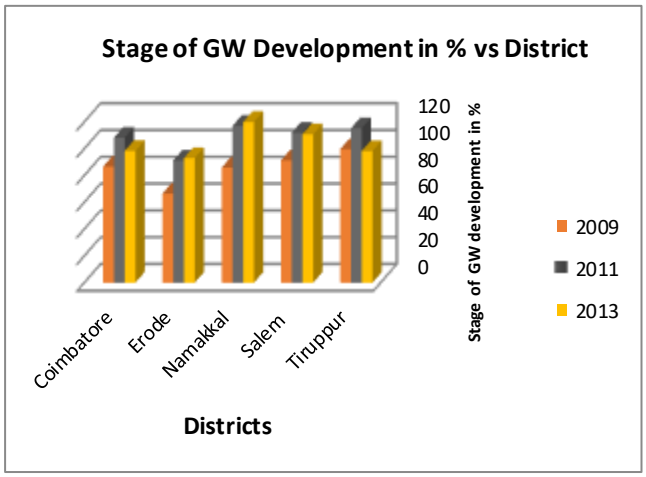
Sl. No	District	Area	No. of Firkas	No. of OE and Critical Firkas
1	COIMBATORE	767	5	3
2	ERODE	3187	31	15
3	KARUR	49	0	0
4	NAMAKKAL	2272	22	15
5	NILGIRIS	1972	11	0
6	SALEM	1962	25	19
7	TIRUPPUR	182	1	0
	Total	**10391**	**95**	**52**

The stage of groundwater development was compared from 2009 to 2013 Groundwater resources. During the year 2011, the stage of groundwater development is high when compare to 2009 and 2013 but groundwater resources of 2009 was estimated for block as assessment unit. The area mainly comprising of three districts such as Erode, Namakkal and Salem are not showing significant change in the groundwater development between 2011 and 2013 (Table 4.3) and (plot) .

Table 4.3 Stage of GW Development

District	Stage of GW Development (%)		
	2009	2011	2013
Coimbatore	87	108	98
Erode	67	91	93
Namakkal	86	117	120
Salem	91	112	111
Tiruppur	100	115	98
Total	**86**	**109**	**103**

Plot showing stage of GW development



4.3. Groundwater in-storage

Based on the conceptual model stimulated in Modflow software, the groundwater in-storage was estimated for Aquifer-I and II and calibrated with field conditions. The results are matching with real field conditions. The results indicate that the groundwater recharge to Aquifer-I is 1483MCM and available groundwater for abstraction is 1264MCM. The estimated total in-storage in the Aquifer-I and II are 414 and 461MCM respectively. The total draft from the aquifer system is 1612 MCM which includes Aquifer- I (1300MCM) and II (312MCM). The groundwater flow in the aquifer system is observed in the model towards SE direction.

5. GROUNDWATER RELATED ISSUE

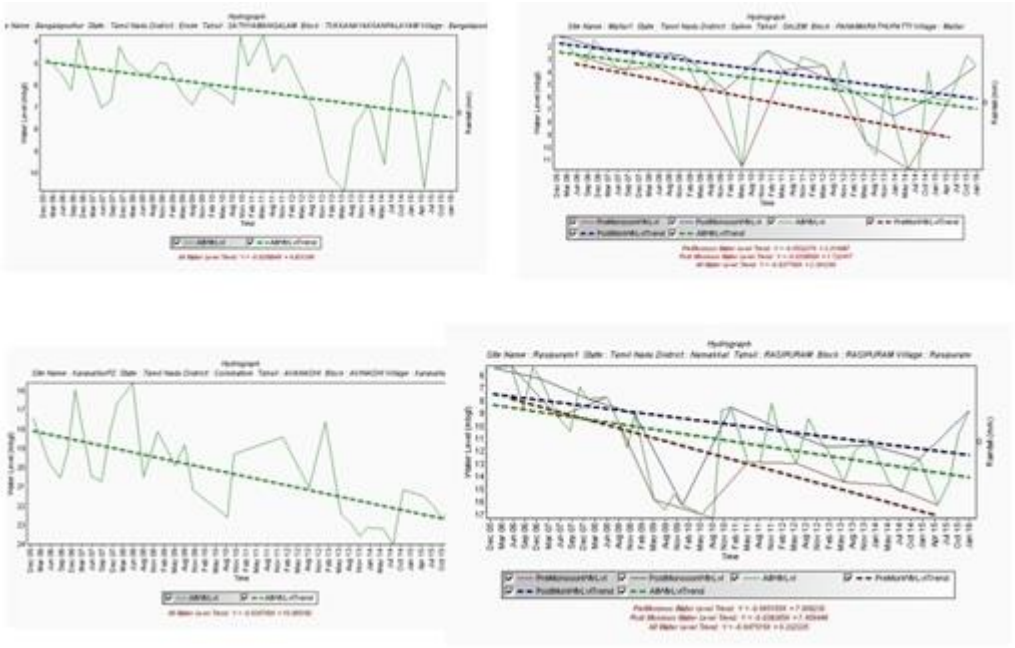
The aquifer systems of the River Basin are highly stressed due to improper groundwater abstraction in the basin. The groundwater in the aquifer systems are also contaminated anthropogenically and geogenically.

5.1 Groundwater utilisation for irrigation purposes

The groundwater is main source for irrigation in the area and it is covering 5419.14 sq.km of which 2520 sq km area is being irrigated by groundwater. In the area, cash crops such as paddy, banana and sugar cane are grown in 1574.72 sq.km fed mainly from groundwater sources and the remaining area are used for the non-paddy crops. The effective utilisation of groundwater is mainly in 17% of the crop area. Due to intensive agriculture practices followed in the area, the groundwater level is declined considerably varying from 0.01 to 1.15m/year (Hydrographs). More than 50% of the well monitored for groundwater level is showing 0.50m/year. This is observed mainly in dug well showing the groundwater level lies between 10-20mts and these dug wells are located generally in the upland of the gneiss and granite formation existing in the area. During non-monsoon period, dug

wells which falls in this zone are almost dry and also increases the stress on the fractured aquifer systems. The groundwater from fractured aquifer is used extensively for agriculture purposes and due to erratic rainfall, the groundwater in the aquifer is not recharged as per the demands for irrigation. Hence, the groundwater is being withdrawn from in-storage of the aquifer systems leaving aquifers either in dry state or over-exploited. This is felt in 52 nos of Firkas out of 95 nos Firka as per the groundwater resources estimation.

Hydrographs of the GWMW located in the aquifer basin



5.2 Anthropogenic Contamination

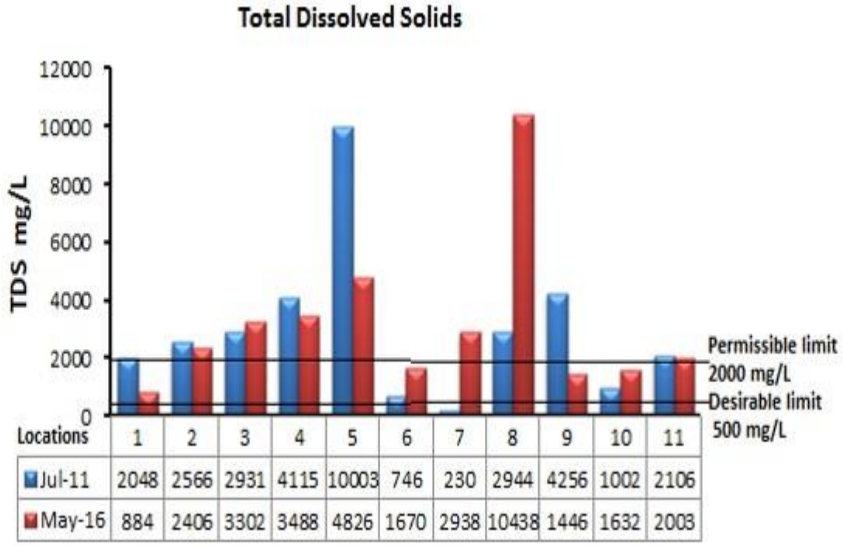
The aquifer systems in the basin is in acute alarming stage due to anthropogenic activity mainly of industries located in the basin. The industries are mainly Tanning, Dye, Bleaching, Electroplating and Engineering Industries. The industries are letting the untreated effluents into natural drain systems. The highly hazardous contamination from effluents are polluting not only surface water but also groundwater sources. The impact on bio-diversity is mushroomed in the area due to pollution in the area. To know the impact of pollution in the aquifer system, industrial cluster study was carried out in around the industrial area. The dug well water samples were collected in and around industry located in Erode and Coimbatore districts for two periods (July-2011 and May-2016) and analysed for basic parameters and heavy metals in Chemical laboratory, SECR, CGWB, Chennai.

5.2.1 Industrial contamination in Erode district

The samples collected from 11 locations in Erode districts indicates that Total Dissolved Solids (TDS) of groundwater is ranging from 250 mg/l to 10003 mg/l in the area during the year-2011 (Plot-2). Of 11nos of location, 7 nos of samples are showing the above the permissible limits of TDS (>2000 mg/l). During the year2016, TDS is ranging from 884 mg/l to 10438mg/l and 7 nos of samples are showing TDS more than permissible limits. 3 nos of samples are showing abnormal increase of TDS from 2011 to 2016. This may be due to new source of pollution and also more residential period of chemical constituents which induce the pollutants gets interaction with the groundwater of the aquifer system. It is major threats for groundwater quality. All the trace elements are well below the

permissible limits except Chromium showing the high concentration of more than permissible limits (> 0.05mg/l).

Plot No-2: TDS distribution of Industrial samples in Erode District.

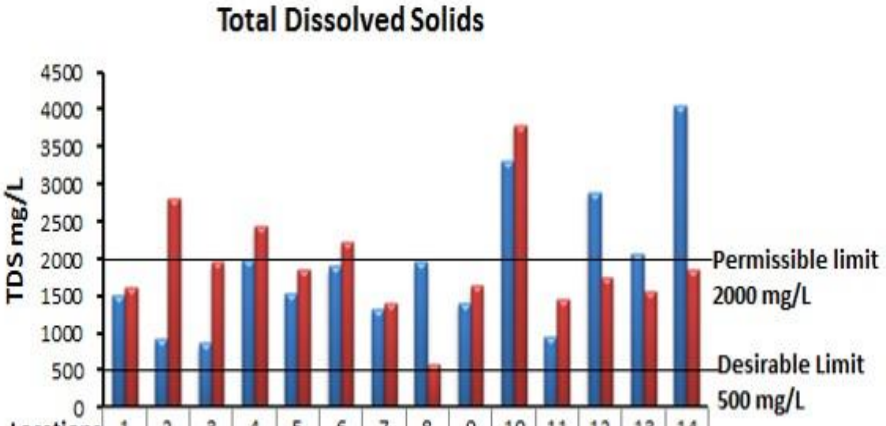


Locations	1	2	3	4	5	6	7	8	9	10	11
Jul-11	2048	2566	2931	4115	10003	746	230	2944	4256	1002	2106
May-16	884	2406	3302	3488	4826	1670	2938	10438	1446	1632	2003

5.2.1 Industrial contamination in Coimbatore district

The samples collected from 14 locations in Coimbatore districts indicates that Total Dissolved Solids (TDS) of groundwater is ranging from 873 mg/l to 4064 mg/l in the area during the year-2011 (Plot-3). Of 14nos of location, 3 nos of samples are showing the above the permissible limits of TDS (>2000 mg/l). During the year2016, TDS is ranging from 597 mg/l to 3320mg/l and 4 nos of samples are showing TDS more than the permissible limits. Most of the samples in both years 2011 and 2016 are falling between 500 mg/l to 2000mg/l. All the trace elements are well below the permissible limits except Lead showing the high concentration which is more than permissible limits (> 0.01mg/l). 9 nos of samples are showing TDS increased from 2011 to 2016 and out of 9 nos, 4 nos of samples are crossed the permissible limits.

Plot No-3: TDS distribution of Industrial samples in Coimbatore District.



Locations	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Jul-11	1525	936	873	1985	1544	1909	1323	1959	1418	3320	964	2904	2079	4064
May-16	1625	2816	1959	2457	1871	2237	1411	597	1657	3812	1462	1764	1581	1865

Both the studies reveal that the source of pollution is more important to prepare proper remedial measures. In Erode district, the source of pollution is from industrial waste of tanning, dye and bleaching industry where as in Coimbatore district, the source is from electroplating and engineering industry.

5.3 Geogenic contamination

5.3.1 Total Dissolved Solids (TDS) of Aquifer-I

The groundwater samples were collected from Aquifer-I and analysed for chemical properties of water, includes anion and cat ions concentration in groundwater. In addition to that Fluoride and Nitrate concentration were also analysed. In the report, TDS and Fluoride concentration of groundwater are discussed spatially. TDS of 0 to 500, 500-1000, 1000-1500, 1500-2000, and above 2000 mg/l concentration are depicted in map (Fig-5.1).

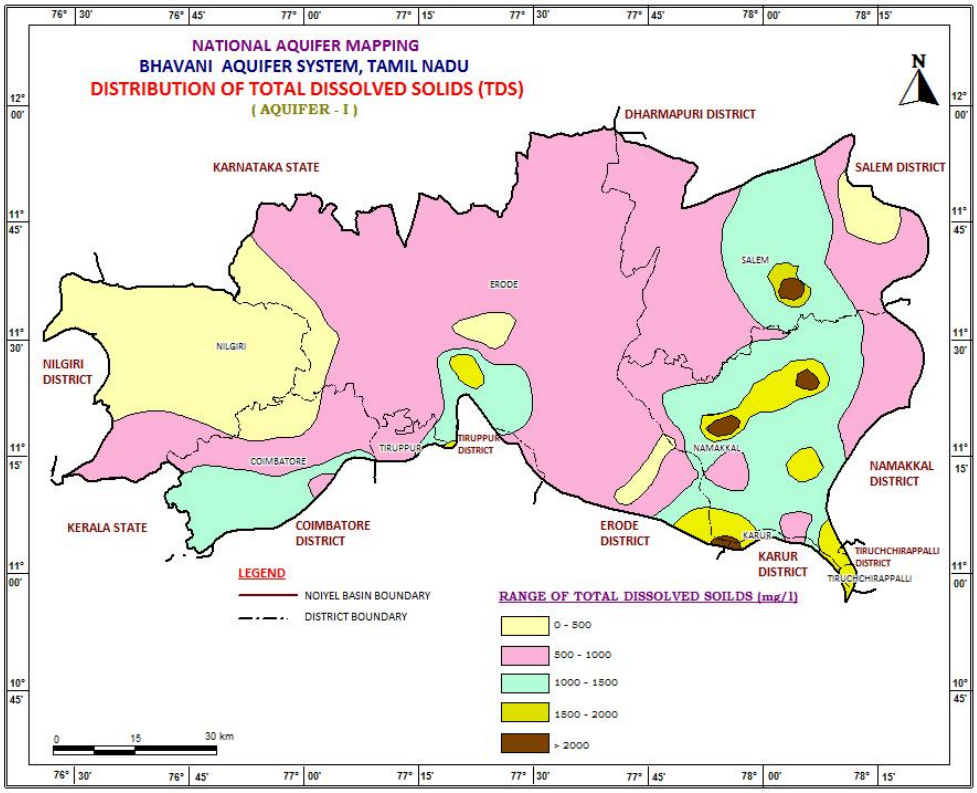


Fig-5.1 Spatial distribution of TDS in Groundwater (Aquifer-I)

TDS of 0-500 mg/l is occurring in western parts of the study area and in eastern parts of the area, 0-200mg/l is occurring in small pockets. TDS of 500-1000mg/l is covering large parts of the area and both the classes are generally found in charnockites and gniessic Formation. TDS of > 1000mg/l is occurring predominantly in the eastern parts of the area trending N-S direction. This may be due to granitic formation is occurring in the eastern parts of the study area. The higher concentration of TDS is falling in Salem and Namakkal districts. TDS of >2000mg/l is generally found in eastern parts of the study area in small pockets.

5.3.2 Fluoride (F) concentration and distribution in Aquifer-I

Fluoride concentration of groundwater is depicted in map (Fig- 5.2) spatially indicating in three zones i.e 0.0 – 1.0, 1.0 -1.5 and > 1.5 mg/l. 0.00-1.00 Fluoride zones is occupying in very large area and falling desirable limits. The zone 1.00 – 1.5 mg/l, permissible limits is falling eastern, central and western parts of the study area trending NE-SW direction. The high concentration of Fluoride (> 1.5mg/l), above permissible limits is predominantly found in eastern parts of the study area where granitic rock formation occurring.

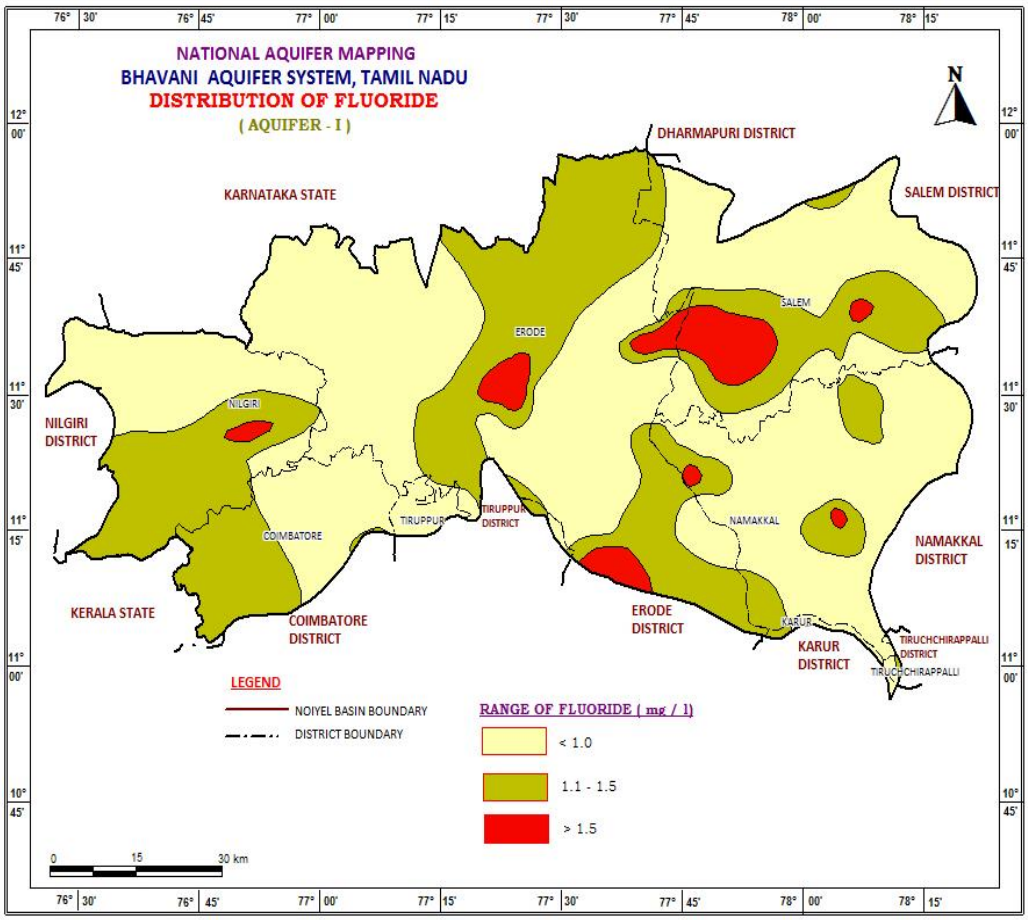


Fig-5.2 Spatial distribution of Fluoride in Groundwater (Aquifer-I)

Table 5.1 Groundwater Class based on Fluoride concentration

Fluoride mg/L	Water Class	Percentage of Samples
0 - 1.0	Desirable limit	68%
1.0 – 1.5	Permissible limit	8%
>1.5	Above permissible limit	24%

Based on BIS standard on groundwater quality for Fluoride concentration, groundwater is classified into three class for drinking water purposes. Fluoride concentration between 0.0 – 1.0 mg/l in

groundwater is comes under desirable limits which is highly suitable drinking water purposes. Fluoride concentration between 1.0 – 1.5 and >1.5 mg/l in groundwater are falling under permissible and above permissible limits which is not suitable drinking water purposes. In the study area, 68% of the ground water samples are falling under desirable limit (Table no: 5.1) and 8% of water samples are falling in permissible limits. 24% of water samples are having Fluoride concentration >1.5 mg/l which is harmful and hazardous for human beings.

6.0 AQUIFER MANAGEMENT PLAN

6.1 Management Strategies

The stage of groundwater development in the Aquifer Basin is categorised as over exploited /critical in 52 firkas. The Net availability of the resource is 1350 MCM. The total ground water demand for the basin is 2213MCM. The supply of groundwater from the aquifer system is 1323.14MCM. The gap between demand and supply is 889.86MCM in the basin (Table-6.1). The gap between demand and supply resources may be met from surface water sources for all purposes in the basin. Based on the supply of groundwater resources, the stage of groundwater development of the basin is 98%. To bring safe groundwater development, 28% of groundwater development (i.e. 370MCM) should be added to the groundwater system of the basin. Therefore, supply side intervention is proposed in the basin through groundwater augmentation plan as sufficient uncommitted surplus runoff of 620 MCM available in the basin. The most acceptable method for augmentation plan is artificial recharge to groundwater.

Table 6.1 Demand and supply groundwater resources of the basin

Sl.no	Management plan	In MCM
I	Demand	
1	Water Intensive Crops	1600
2	Other Crops	495
3	Domestic and Industry	118
4	Total Demand	2213
II	Supply	
1	Agriculture	1204.91
2	Domestic and Industry	118.23
3	Total Supply	1323.14
III	Demand - Supply Gab	889.86
IV	GW Utilisataion Source	
1	Replnishbale	1350.01
2	In storage	26.87

6.2 Supply side intervention

Based on the water level monitoring in different seasons across the basin, as well as after having better understanding of the disposition and extent of the aquifer system through exploratory drilling, pumping tests etc. the volume of unsaturated zone available for recharge (upto 3m bgl) is 1149 MCM. But the annual uncommitted runoff is only 620 MCM which is about 50% of required water to fill the available void space of aquifer-I. Artificial recharge and Water conservation plan is prepared firka wise in the basin to harness less than 15% of the annual uncommitted runoff of 620 MCM with a total out lay of Rs.187.17Crores. The suggested artificial recharge structures are mainly Nala bunds, Check Dams and Recharge Shafts in addition to removal of silt in the surface tanks.

6.2.1 Spatial data integration

An attempt has been made to demarcate area suitable for artificial recharge structures using remote sensing and GIS techniques. Geology, geomorphology, landuse/landcover, drainage and surface waterbody maps were prepared using remote sensing data and generated in GIS environ. In addition to that water level and weathered zone thickness maps were prepared using data GWMW and groundwater exploratory well. These layers were assigned weightage for the theme and map classes. Geomorphology and geology layers are given higher weightage as it is playing vital role in groundwater recharge. All the layers were integrated spatially using overlay index model run in GIS. The integrated map is demarcated with four zones such as 1. Poor, 2. Moderate, 3. High and 4. Very High and it is shown Fig-6.1 for Bhavani Sagar Firka. Similarly, it was done for the entire basin.

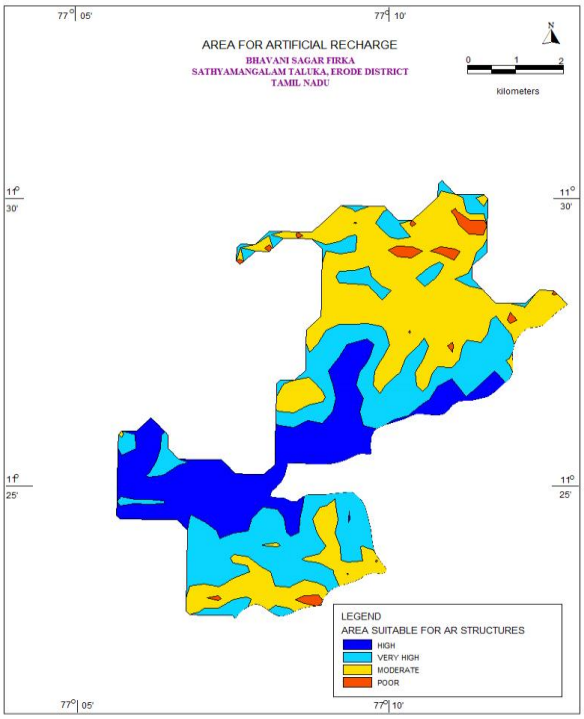


Fig-6.1 Area suitable for artificial recharge structure in Bhavani Sagar Firka

The poor zone is not suitable for any artificial recharge structures and it is acting as catchment area. Moderate suitable zone is generally falling in first order streams and shallow weathered thickness. Therefore, it is suitable for Nala bund, Boulder Check dam and small storage Check dam. High and very high suitable zones are falling in higher order streams and moderate to deep weathered thickness. Percolation pond and large storage check dam are the main artificial recharge structure which can be erected in high and very high zones. The sample map is shown for proposed ARS in Firka (Fig-6.2).

Table 6.2 Zones feasible AR structure

ZONE	% OF AREA COVERAGE	Suitable ARS
Very high	24	Suitable for all major recharge structures like Percolation pond and stop dam, check dam etc.,
High	34	Suitable for all major recharge structures like stop dam, check dam etc.,
Moderate	40	Suitable for all major recharge structures like earthen check dam, Boulder check dam and Nala bund etc.,
Poor	2	Hilly/Forest /Catchment area

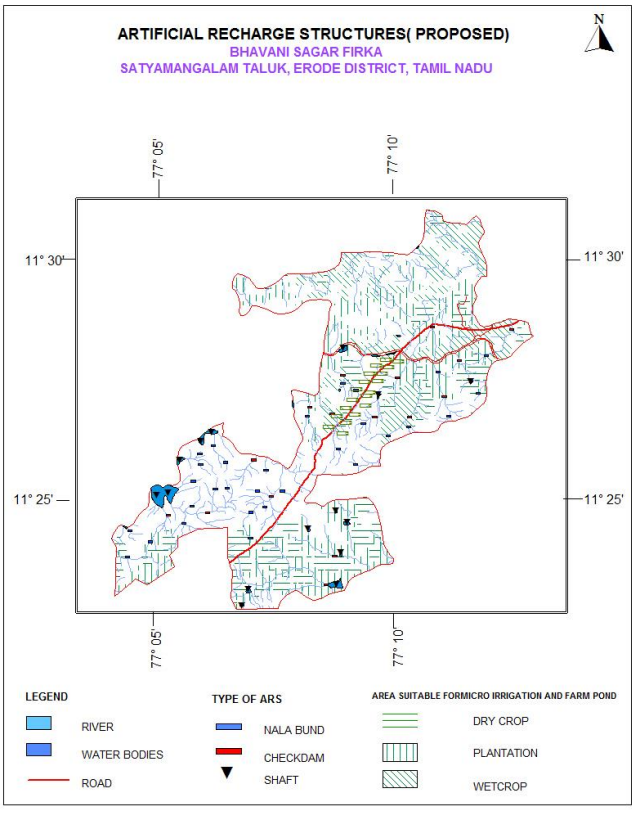


Fig-6.2 Artificial Recharge Structure proposed in the Firka

6.2.2 Artificial recharge structure plan

Artificial recharge zones maps have been superimposed with drainage and surface water body maps to select suitable sites for artificial recharge structures. Nala bund and Checkdam were selected based on the availability of drainage / streams in the basin. Nala bund is generally constructed across the streamlet and beginning of first order stream. Check dam is constructed across the first and second order stream. Surface water body has been mapped using Remote sensing data. The village pond has been identified and those village pond having size of less than 0.025sq.km are selected for Recharge Rejuvenation Ponds (RRP). RRP is done through de-siltation of pond to increase storage which will induce the groundwater recharge. Percolation pond is also selected based on the size of surface water body more than 0.025 sq.km. in both the ponds, recharge shaft is suggested which can recharge the fractured aquifer overlain by non-permeable layers.

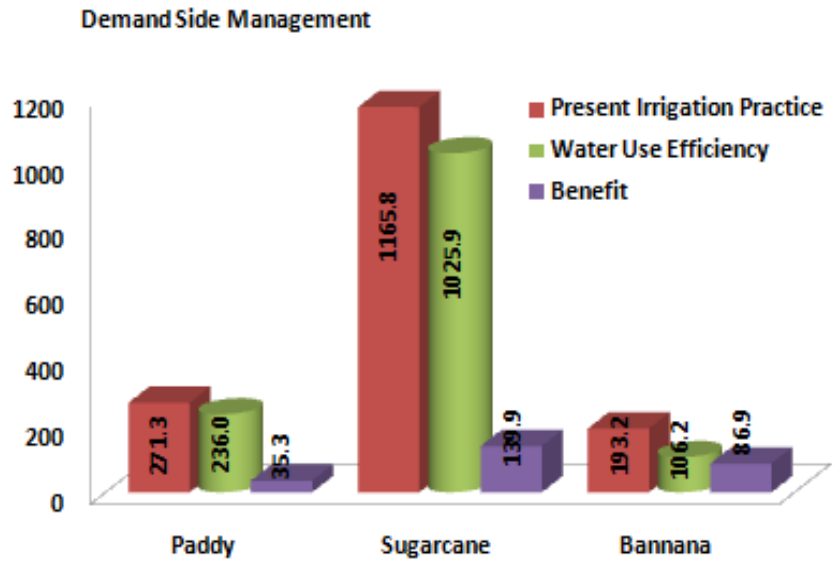
A total number of 81 check dams, 412 nala bunds and 1266 recharge shafts are proposed in the OE and critical firkas of the basin. A total number of 480 Recharge Rejuvenation Ponds are selected for desilting followed by construction of recharge shafts within the tanks. The expected recharge through these artificial recharge structures is 80 MCM which contributes 21% of the 370MCM.

6.3 Water Conservation Plan

Low pressure water distribution system is being proposed in 1630.3 Ha of cropped area which otherwise is under irrigation through earth channels. The expected savings of water through this method is expected to be 3.12 MCM/yr. A total number of 6370 recharge ponds are proposed which will act as storage tanks in farm as well as augment groundwater recharge and the expected annual groundwater recharge through these ponds is in the order of 7.93 MCM. The recharge ponds area has been selected based on the wet and dry crops area from landuse / landcover maps using remote sensing data.

6.4 Demand side Management Plan

Demand side management can be accomplished through change in irrigation pattern. It is recommended to change the irrigation pattern for paddy, Sugarcane and Banana crops. The general practice for paddy irrigation is by flooding method. It is recommended for ridge and furrow method instead of flooding method in 169.5 sq.km and this would save 35.3 MCM of water annually (Plot-6.1). Similarly, for sugarcane and banana crops shift from flooding method to drip irrigation would save 139.1 MCM and 86.9 MCM respectively. The total water saved is 261.3 MCM. The total cost for the change in the irrigation pattern for those water intensive crops would be 465 crores.



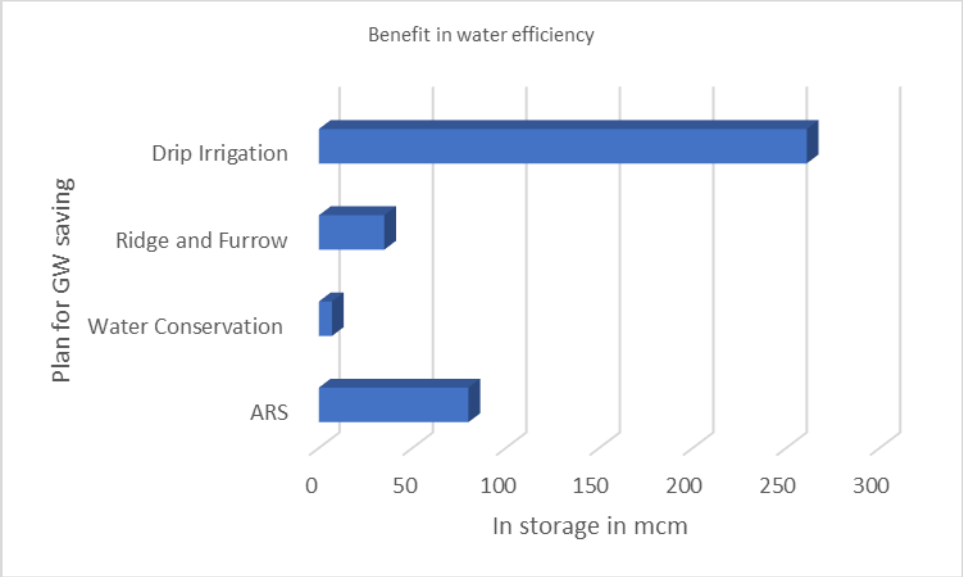
Plot-6.1 Water efficiency by implementing micro irrigation system

6.5 Savings of In-storage

The groundwater development in the basin is 98% as per the prorate basis against the groundwater availability of 1350MCM. Of 1350MCM, 30% i.e 370MCM of groundwater is utilised more every year. To reach the safe groundwater development in the basin, measures are suggested and estimated the in-storage savings to groundwater systems. The water intensive and cash crops such as paddy, sugar cane and banana are consuming lion share of water for cultivation. By adopting the micro-irrigation systems and ridge and furrow techniques for those crops, water using efficiency various from 13 % to 40% which save 296 MCM in the aquifer system (Table 6.3 and Plot 6.2). It is contributing 77% to execs groundwater development and it implies that the groundwater can be saved by adopting micro-irrigation system and ridge and furrow method to reduce the stage of groundwater development drastically. The in-storage through ARS is 80 MCM and it contributes 20.89% to execs groundwater development.

Table 6.3 In storage savings in aquifer system

Intervention	Management Plan	In storage saving (MCM)	% of in storage savings
Supply side Management	ARS	80	20.89
	Water Conservation	7	1.83
Demand side Management	Ridge and Furrow	35	9.14
	Drip Irrigation	261	68.15
	Total	**383**	100.00



Plot-6.2 In-storage in aquifer system

7.0 ACTION FOR GROUNDWATER PLANNERS, WATER USER AGENCY AND STACK HOLDERS

The main objective of the aquifer mapping in the study area is to improve the groundwater scenario in the Bhavani River basin aquifer systems by balancing the supply and demand of the groundwater. To understand the aquifer configuration in the basin, disposition of the aquifer, water holding properties including transmissivity, groundwater quality and most importantly groundwater utilisation have been carried in the basin.

The total geographic area of the basin is 10,391 sq.km of which mappable is 9,193 sq.km area. It comprises of 7 districts and 95 firkas. The average annual rainfall is 811.47mm. Physiographically, the area is falling in western Ghats hill in occupied in western parts and plain in eastern parts of the study area. Bhavani, Moyar, Cauvery and Thirumanimuthar Rivers are draining in the basin. %8 % of the land is used for agriculture purposes.

In the study area, two aquifer systems such as Aquifer-I (weathered) and Aquifer-II (fractured) have been demarcated. The Aquifer-I is having the thickness ranging from 7 to 38mts and yield ranging from 15 to 20m^3/hr. the transmissivity of the aquifer is ranging from 5 to 26 m^3/day and the TDS is ranging from 150 to 4670 µs /cm. The groundwater extraction from this aquifer can sustain 2 -5hrs. The aquifer-II thickness is ranging from 10 to 200mts and having the yield is ranging from 2 to 15 m^3/hr and Transmissivity is ranging from 1 to 80 m^2/day.

The groundwater development is very serious concern in the area. Due to this, decline of groundwater level is observed and groundwater is extracted extensively for the agriculture purposes. Based on the groundwater estimation-2013, the stage of groundwater development is 98% with of available 1350MCM. To have 70% of the groundwater development in the aquifer systems, micro-irrigation can be adopted which saves 296MCM of water and by artificial recharge structures, 80 MCM can be saved. Both together it works out 383 MCM. Hence, it is right time to shift water spreading/ flooding method to drip irrigation which can really save the more than 100 % of excess withdrawal.

Annexure-I: Details of aquifer properties of the Basin collected through groundwater exploration

Sl. No.	Location, Well number, Co-ordinates, Toposheet Number and R.L. of G.L. (mamsl)	Depth drilled Casing Pipe Lowered (mbgl)	Lithology	Fracture zones encountered (mbgl) / Discharge (lps)	SWL (mbgl) Date	Discharge (lps) Drawdown (m)	Specific capacity (lpm/m of Draw down)	T (m^2/ day)	S
1	MANGARAI(EW)-1222 (11° 04' 50";76° 49' 30"-58 A/16) 615.560	134.72 62.48	Sand and Clay followed by fractured Biotite Gneiss	65.50-71.50 106.00-113.50 127.00-128.60 (9.75)	25.52 15.5.78	6.66 36.70	10.89	2.63	--
2	VEERAPANDIPUDUR(EW)-1219 (11° 05' 00";76° 51' 00"-58 A/16) 557.030	188.97 82.14	Sand, Clay with gravel followed by fractured Biotite gneiss and pegmatite	95.00-99.00 115.00-118.00 127.50-135.00 181.50-188.00 (2.96)	39.16 22.4.78	2.00 20.49	5.856	15.07	6.3 x 10^{-4}
3	CHINNATHADAGAM(EW)-1217 (11° 06' 00";76° 52' 00"-58 A/16)	152.04 100.60	Sand, Clay with gravel followed by fractured Biotite Gneiss	37.30-43.70 62.45-65.82 70.62-83.20 88.0-91.00 (3.15)	20.89 31.10.76	3.15 12.40	15.24	107.46	2.77 x 10^{-4}

	532.135								
4	PAPPANAICKENPALAYAM (EW)-1209 (11° 04' 35" ;76° 53' 45"- 58 A/16) 497.220	182.80 68.58	Sand, Clay with Gravel followed by Fractured Biotite Gneiss	87.00-107.00 116.00-127.00 161.00-174.00 (3.14)	27.35 23.5.78	2.00 17.74	6.764	35.170	--
	SUGARCANE INSTITUTE								
5	VEERAKERALAM(EW)-1234 (11° 00' 30";76° 55' 00"-58 A/16) 154.630	140.20 61.57	Fractured Biotite Gneiss	2.14	24.78	6.66 25.16	0.265	17.63	5.2 x 10^{-5}
6	VEDAPATTI(EW)-1228 (11° 00' 00";76° 54' 00"-58 A/16)	147.16 47.39	Fractured Biotite Gneiss	11.73	12.56	10.00 18.66	0.536	277.60	--
7	VADAKKALUR(EW)-1201 (11° 16' 15";77° 05' 45") 384.230	184.10 14.94	Fractured Biotite Gneiss	57.00-58.00 73.50-76.00 100.00-103.00 108.00-112.00 116.00-119.00 124.00-134.00 146.00-150.50 155.50-169.00 (3.34)	11.54 2.9.78	2.16 45.40	2.863	1.56	9.1 x 10^{-5}
8	KANUR PUDUR(EW)-1202 (11° 16' 15";77° 10' 30") 367.390	100.74 4.50	Fractured Biotite Gneiss	27.44-33.52 33.52-37.08 37.08-49.24 96.02-100.74(2.523)	16.83	6.66 14.44	0.462	65.51	2.3 x 10^{-2}

9	RUDRAMPALAYAM(EW)-1204	182.86	Fractured	32.00-36.75	17.08	6.66	81.79	374.13	2.46 x
	(11° 14' 45";77° 09' 15")	27.14	Biotite Gneiss	48.00-54.00 (1.20)	13.9.78	4.89			10^{-3}
	362.630								
10	PUDUVALASU (EW)	252.34	Biotite Granite	143.50-145.50/Moisture	>50	--	--	--	--
	11°16'35";77°30'25"-58E/11	6.10	gneiss	158.28-159.28/1.20	16.9.03				
	224.050			166.90-167.90/1.782					
11	MUNGILPALAYAM (EW)	300.00	Granite	172.52-173.52/0.2	>50	--	--	--	--
	11°14'55";77°30'58"-58E/12	6.10	gneiss		24.9.03				
	306.410								
12	MOOLAKOTTAI (EW)	253.50	Granite	248.72-249.72/0.05	>50	--	--	--	--
	11°17'15";77°26'30"-58E/7	6.10	gneiss	252.34-253.50/6.18	7.10.03				
	316.920								
13	GNANIPALAYAM (OW)	214.24	Granite	151.66-153.28/0.2	>50	--	--	--	--
	11°12'45";77°43'05"-58E/12	6.10	gneiss	153.28-154.28/1.789	21.10.03				
	221.910			155.28-156.28/2.11					
14	CHINNIYAMPALAYAM(EW)	252.34	Biotite	104.94-105.94/1.00	5.7	--	--	--	--
	11°07'33";77°47'17"-58E/16	6.1	gneiss	105.94-106.94/1.20	16.11.03				
	213.610								
15	SIVAGIRI (EW)	275.20	Biotite	104.94-105.94/0.5	6.4	--	--	0.7	--
	11°07'35";77°48'20"-58E/16	6.10	gneiss	146.66-147.66/0.9	26.11.03				
	218.510								
16	CHINNAKINATHUPALAYAM (EW)	252.34	Biotite gneiss	154.28-155.28/1.79	33.6	1.5	3.9	--	--
	11°11'45";77°43'48"-58E/12	5.12.03		243.10-244.10/2.50	6.12.03	23.1			
17	PERUMAPALAYAM(EW)	260.00	Granite	14.50-15.50/Moisture	>100	--	--	--	--
	11°08'32";77°50'35"-58E/16	6.10	gneiss	34.36-35.36/0.078	14.1.04				
	242.180								
18	SREENIVASAPURAM-EW II	130.42	Granite	123.80-124.80/1.50	--	--	--	--	--
	11°17'55";77°42'42"-58E/11	6.10	gneiss						
	212.820								
19	KONGALAMPALLI(EW)	206.62	Granite	111.56-112.56/2.12	38.18	0.5	1.07	--	--

	11°17'25";77°40'52"-58E/11 199.250	6.10	gneiss	124.80-125.80/1.50	1.2.04	28.0			
20	NASIYANUR (EW) 11°20'20";77°38'33"-58E/11 220.420	295.00 12.20	Granite gneiss	14.5-15.5/Moisture	-- 12.2.04	--	--	--	--
21	ERODE (OW) 11°20'55";77°44'05"-58E/11 167.910	126.00 6.10	Biotite gneiss	18.12-19.12/Moisture 55.22-56.22/0.77 79.08-80.08/3.01 90.70-91.70/5.54 110.56-111.56/10.12 121.18-122.80/16.4	6.92 22.2.04	--	--	--	--
22	ERODE-VOCPARK (EW) 11°20'50";77°43'00"-58E/11 164.180	267.58 6.10	Granite gneiss	22.12/Moisture	Dry 28.2.2004	--	--	--	--
23	CHENNIMALAI (EW) 11°10'00";77°36'30"-58E/12 269.180	229.48 14.60	Granite gneiss	101.94-102.94/1.00	>80.0 9.3.04	--	--	--	--
24	NICHCHAMPALAYAM (EW) 11°22'00";77°31'30"-58E/8	187	Biotite Granite gneiss	11.5-12.5/0.441 13.5-14.5/0.731 18.12-19.12/2.49 180.14-181.14/3.34 185.76-187.00/27.0	2.37	27 1.67	970.06	--	--
25	NICHCHAMPALAYAM (OW)-I 11°22'00";77°31'30"-58E/8	190	Biotite Granite gneiss	13.5-14.5/moisture 18.12-19.12/0.215 25.74-27.74/0.732 51.6-52.6/3.34 88.7-89.7/4.36 186.76-188.76/26.0	2.01	26		--	--
26	NICHCHAMPALAYAM (OW)-II 11°22'00";77°31'30"-58E/8	186	Biotite Granite gneiss	9.5-10.5/2.49 12.5-13.5 25.74-26.74/4.36 140.0-142.0/6.88 181.14-182.14/10.12 184.7-186.1/18.97	1.7	18.9		--	--
27	MAKALPUDUR (EW)	195.00	Biotite	12.5-13.5/moisture	4.33	0.73	--	--	--

	11°30'00";77°34'07"-58E/10		Granite gneiss	19.12-20.12/0.215 25.74-26.74/0.441 47.6-48.6/0.73					
28	UNJAKKATTU COLONY (EW)-I 11°37'15";77°33'57"-58E/10	25.00	Biotite Granite gneiss	20.12-21.12/0.441 22.12-23.74/2.9		2.9	--	--	--
29	UNJAKKATTU COLONY (EW)-II 11°37'18";77°34'18"-58E/10	227.5	Hornblende Biotite gneiss	58.2-59.2/Dry 67.4-69.4/0.21 100.9-101.9/0.44 224.8-225.8/2.49		--	--	--	--
30	KONGUPALAYAM (EW) 11°32'55";77°21'50"-58E/6	160.90	Charnockite	11.5-12.5/0.215 118.1-119.1/0.215 113.4-134.4/1.21	11.51	--	--	--	--
31	KUMARAYANUR (EW) (VADIVELANUR) 11°44'31";77°41'50"-58E/10	229.48	Charnockite	11.5-12.5/0.078 14.5-17.1/0.97 121.1-122.8 /1.48 141-142 /2.49 166.1-168.5 /3.0	11.35	1.78 18.2	5.86	--	--
32	MUNANCHAVADI (EW) (ANTHONARPURAM) 11°37'58";77°42'42"-58E/11	176.14	Hornblende gneiss	86.7-88.7-3.83	35.75	3.8 5.5	41.45	--	--
33	MUNANCHAVADI (OW) (ANTHONARPURAM) 11°37'58";77°42'42"-58E/11	214.24	Hornblende gneiss	86.7-88.7/Dry 92.32-94.32/Moisture 95.32 - 98.32/Moisture 101.94-104.94/Dry 113.56-115.16/0.078	32.15	0.078 6.43	9.33	--	--
34	MYLAMPADI (EW) (11°31'22";77°40'45") 58 E/10	134 8.75	Granite Gneiss	19-20/ 0.316 43.2-44.2/ 0.276 70.2-71.2/ 0.418 108-109/ 3.36 132-133/ 1.17	56.34 22.02.04	5.53 3.22	22.96	6.5 (Jacob) 15.28 (Theis)	--
35	CHINNAPULIYUR (EW)	300	Granite	84.4-85.4/ Moisture	11.75	1.79	0.78	--	--

	(11°27'00";77°38'00") 58 E/11	25.75	Gneiss	160-161/ 1.79	24.02.04	40.81			
36	THALABAYANUR (EW) (11°28'10";77°40'20") 58 E/11	300 27.25	Bio. Gr. Gneiss	20-21/ 1.0 53-54/ 1.50 115.5-116.5/ 1.51	20 23.02.04	3.01 25.9	2.85	--	--
37	ORICHERI COLONY (EW) (11°27'35";77°36'00") 58 E/11	300 16.30	Bio. Gr. Gneiss	4-5/ Moisture 9-10/ 0.5 20.6-21.6/ 1.0 139-140/ 0.91	3.25 23.02.04	1.91 17.17	1.75	--	--
38	RASIPURAM(EW)-2818 (11° 27' 45";78° 11' 45"-58 I/3) 240.395	183.29 2.75	Gneiss Charnockite	47.13 - 48.13 / 0.215 61.37-62.37 / 2.11 70.99-99.47 / 4.90 172.00-174.00 / 8.40	55.73 24.6.90	3.08 6.22	57.85	40.86	4.1 x 10^{-4}
39	RASIPURAM (OW) 240.505	229.01 --	Granite Gneiss	57.75-58.75 / 0.21 62.37-63.37 / 2.00 79.61-80.61 / 4.90 171.05-172.05 / 8.40	58.09 24.6.91	--	--	--	--
40	DHARAPURAM(EW)-2803 (11° 46' 30"; 78° 01' 30"-58 I/1) 297.430	94.68 3.50	Gneiss	85.52-94.00 / 12.54	5.64 20.12.90	3.92 6.66	35.326	16.32	9.6 x 10^{-5}
41	DHARAPURAM(OW) 296.050	96.60 3.50	Gneiss	95.60-96.00 / 12.00	6.00 20.12.90	12.51	--	--	--
42	VALAYPPATI(EW)-2833	152.19	Biotite Gneiss	32.89-33.00 / 3.34	21.10	2.96	59.92	--	5.31 x

	(11° 07' 30" ;78° 09'45"-58 I/4) 139.500	6.02	with Pegmatite Intrusions	117.71-118.00 / 5.00 at 139.57 / 15.26	23.2.91	2.97			10^{-5}
43	VALAYPPATI (OW) 142.220	292.20 5.80	Ganetiferous Biotite gneiss with Pegmatite Intrusions	43.50-44.51 / 0.215 156.00-157.00 / 0.441 219.00-220.00 / 2.49 287.00-288.00 / 3.838 291.00-292.00 / 8.43	--	--	--	44.96	--
44	THOKKAVADAI (EW)-2823 (11°22' 00" ;77° 50'45"-58 E/15) 218.00	145.10 5.60	Granite Gneiss and Biotite Gneiss	at 94.98 / 0.5 143.58 - 144.00 / 6.88	24.58 11.2.91	2.40 32.08	4.491	4.34	6.0 x 10^{-4}
45	THOKKAVADI(OW) 219.300	180.18 5.60	Granite Gneiss Biotite Gneiss	at 147.00 / 0.710 at 178.00 - 7.623	--	--	--	--	--
46	ELAICHIPALAYAM(EW)-2827 (11° 22' 30";78° 01' 30"-58 I/3) 191.800	197.00 4.50	Granite Gneiss Biotite	8.80-9.18 / 1.8	--	--	--	--	--
47	ELUR (EW) - 2829 (11° 21' 00" ;78° 06'35"-58 I/3) 183.145	300.00 6.12	Granite Gneiss	25.27-26.29 / 1.80	28.10 11.1.91	--	--	--	--
48	VENNANDURI(EW)-2820 (11° 30' 30" ;78° 08'45"-58 I/2) 242.880	300.00 6.10	Biotite Gneiss Charnockite	180.0-181.00 - Negligible	Moisture only Dry	--	--	--	--
49	BELUKURICHI (11°23'10";78°15'58"-58I/3) 50 DIVATTIPATTI (EW)-2804	300 18.00 195.48	Biotite Hornblende Gneiss Gneiss	142-143/0.441 51.08-52.08 / 0.40	84.40 11.3.04 30.20	0.441 -- --	--	--	--

	(11° 53' 00" ;78° 05' 20"-58 I/1) 343.970	11.50		145.58-146.68 / 0.166	--				
51	KONGANAPURAM(EW)-2822 (11° 34' 00";77° 54' 13"-58 E/14) 233.610	98.00 7.00	Granite Gneiss rich in Biotite	16.38-17.38 / 1.20 90.00-90.50 / 2.49	38.35 26.9.96	6.50 0.90	27.11	48.20	4.86 x 10^{-3}
52	KONGANAPURAM(OW) 233.420	180.08 6.75	Granite Gneiss	At 95.00 - water struck 149.58-150.58 / 1.00	--	--	--	51.90	2.9 x 10^{-3}
53	PADAVEEDU(EW)-2824 (11° 29' 15";77° 51' 10"-58 E/15) 241.200	213.00 5.00	Biotite Gneiss	193.00-194.00 / 3.34	57.00 21.1.91	2.68 3.83	42.01	21.00	3.3 x 10^{-4}
54	PADAVEEDU(OW) (11° 29' 15" ;77° 51'10"-58 E/15) 243.300	140.58 5.00	Biotite Gneiss	71.00-73.48 / 2.50 104.98-105.98 / 3.838 135.48-136.48 /9.241	14.61 25.8.96	0.33 (While pumping EW)	--	106.00	--
55	KADATHUR (EW) - 2828 (11° 33' 45" ;78° 08'00"-58 I/2) 241.815	115.00 9.50	Biotite Granite Gneiss	40.58 - 41.58 45.98 - 46.98 - Dry 94.90 - 95.90	18.93 8.3.91	2.77 19.69	8.448	3.27	4.3 x 10^{-2}
56	KADATHUR (OW) 241.500	170.98 12.48	Charnockite Biotite Gneiss	54.00 - 55.00 / 1.00 130.00 - 131.00 / 3.85	19.40 8.9.91	5.3 while pump-ing E.Well	--	5.92	--
57	ELAMPILLAI (EW)-2802 (11°43' 30" ;78° 03'30"-58 I/2)	227.00 7.00	Granite Biotite	at 40.00 / 0.75	31.40 7.2.91	--	--	--	--

	267.715		Gneiss						
58	PANAMARATHUPATTI(EW)-2816	160.10	Granite	at 40.00 / 6.91	32.18	2.77	16.76	16.26	--
	(11°34' 15" ;78° 11'00"-58 I/2)	--	Charnockite	at 140.00 / 10.121	15.3.91	9.92			
	283.695								
59	PANAMARATHUPATTI(OW)	160.00	Granite	112.00-113.20 / 4.36	32.26	3.01	--	33.50	--
	(11°34' 15" ;78° 11'00"-58 I/2)	--	Charnockite	159.20 - 160.00 / 6.883	15.3.91	9.16			
	283.875								

Annexure-II: Groundwater level of pre-and post monsoon in the basin

Slno	District	Location	Type of structure	RL in mts	Latitude	Longitude	Decadal Mean WL in mbgl (May-2006-15)	Decadal Mean WL in mbgl (Jan-2007-16)
1	Coimbatore	P.N.palayam	Bore Well	423.69	11.21	76.99	24.50	34.55
2	Coimbatore	Mettupalayam pz	Bore Well	338.17	11.30	76.95	8.05	8.77
3	Coimbatore	Thekkampatti pz	Bore Well	321.10	11.26	76.93	5.90	5.78
4	Coimbatore	Pongalur1	Dug Well	412.31	11.30	77.13	0.61	0.45
5	Coimbatore	Karamadai	Dug Well	364.43	11.25	77.21	1.82	1.52
6	Coimbatore	KaravallurPZ	Bore Well	367.13	11.29	77.17	22.88	21.88
7	Erode	Pilliyampalayam pz	Bore Well	290.00	11.34	77.32	13.85	16.15
8	Erode	Punnam pz	Bore Well	202.00	11.51	77.61	2.40	4.10
9	Erode	Bhavani1	Dug Well	157.68	11.81	77.53	8.62	9.27
10	Erode	Rajan Nagar pz	Bore Well	285.00	11.53	77.14	9.30	9.90
11	Erode	Ammapet1	Bore Well	199.71	11.63	77.72	4.75	5.15
12	Erode	Malaiyapalayam pz	Bore Well	336.10	11.29	77.33	43.60	43.90
13	Erode	Erode2	Dug Well	161.09	11.33	77.73	5.20	5.40
14	Erode	Kavundapadi1	Dug Well	191.92	11.42	77.56	5.71	5.71
15	Erode	Rajanagaram	Dug Well	300.00	11.55	77.14	12.49	12.34
16	Erode	Unjalur	Dug Well	135.74	11.13	77.88	3.63	3.43
17	Erode	Kolappalur1	Dug Well	263.14	11.38	77.43	10.50	9.90
18	Erode	Kathampalayam pz	Bore Well	245.00	11.43	77.24	2.15	1.45
19	Erode	Periyapuliyur pz	Bore Well	190.00	11.43	77.65	1.15	0.45
20	Erode	Sathiyamangalam	Dug Well	239.32	11.50	77.25	8.69	7.98
21	Erode	Attani	Dug Well	197.74	11.52	77.52	9.97	9.21
22	Erode	Indiampalayam	Dug Well	228.99	11.45	77.27	3.85	2.90
23	Erode	Sathyamangalam1	Bore Well	238.88	11.50	77.24	10.04	9.00
24	Erode	Archalur	Dug Well	247.76	11.16	77.70	5.94	4.84
25	Erode	Ariyappanpalayam pz	Bore Well	192.00	11.48	77.25	5.28	4.15
26	Erode	Kavundappadi	Bore Well	191.62	11.43	77.56	4.95	3.80
27	Erode	Kottamangalam	Bore Well	253.59	11.46	77.13	9.55	8.20
28	Erode	Vellodu new	Dug Well	275.11	11.24	77.66	3.08	1.70
29	Erode	Avalpundurai	Bore Well	217.40	11.23	77.72	2.90	1.45
30	Erode	Kavilipalayam pz	Bore Well	270.00	11.38	77.23	3.80	2.28
31	Erode	Asanur pz	Bore Well	186.00	11.67	77.13	14.85	13.01
32	Erode	Talavadi new	Dug Well	870.15	11.78	77.02	2.45	0.40
33	Erode	Elmattur	Dug Well	191.61	11.19	77.78	3.19	0.94
34	Erode	Alukuli pz	Bore Well	207.00	11.45	77.36	7.60	5.10

35	Erode	Ammapet2	Dug Well	198.10	11.62	77.74	5.55	2.88
36	Erode	Adachapalayam	Dug Well	210.51	11.52	77.47	10.50	7.60
37	Erode	Urachikottai	Bore Well	180.02	11.48	77.69	4.90	1.75
38	Erode	Kasipalayam	Dug Well	232.08	11.46	77.34	8.40	4.95
39	Erode	Guvuar dw	Dug Well	247.00	11.64	77.68	9.00	5.40
40	Erode	Pungaipuliampatti	Bore Well	285.00	11.35	77.17	10.35	6.70
41	Erode	Perundurai1	Dug Well	277.93	11.28	77.58	16.38	12.53
42	Erode	Priyakolanalli pz	Bore Well	140.00	11.17	77.86	4.65	0.68
43	Erode	Chittodu	Dug Well	197.54	11.39	77.68	6.89	2.74
44	Erode	Gobichettipalayam pz	Bore Well	225.26	11.45	77.45	11.40	7.08
45	Erode	Bangalapudhur	Dug Well	216.21	11.50	77.41	10.70	6.30
46	Erode	Pandiyampalayam pz	Bore Well	229.00	11.40	77.52	13.05	8.56
47	Erode	Guruvareddiyur	Bore Well	243.95	11.64	77.68	10.70	5.15
48	Erode	Krishnapuram	Dug Well	174.01	11.54	77.71	11.51	5.83
49	Erode	Getticheviyur	Bore Well	294.63	11.33	77.41	14.25	8.50
50	Erode	Nasiyanur	Dug Well	221.51	11.34	77.59	14.34	8.39
51	Erode	Gobichettipalayam1	Dug Well	225.26	11.46	77.45	9.60	3.39
52	Erode	Punnachipudur dw	Dug Well	212.00	11.59	77.67	14.90	8.20
53	Erode	Velliyampalayamputhur pz	Bore Well	250.00	11.49	77.16	7.95	1.20
54	Erode	Kurichi pz	Bore Well	193.00	11.57	77.70	8.50	1.50
55	Erode	Talavadi pz	Bore Well	800.00	11.77	77.00	17.25	9.45
56	Erode	Gandhinagar Thaneerpanthalpalayam	Dug Well	182.00	11.66	77.68	16.30	8.45
57	Erode	Settunampalayam pz	Bore Well	210.00	11.52	77.60	15.65	6.70
58	Erode	Chennampatti pz	Bore Well	259.00	11.70	77.67	14.60	4.50
59	Erode	Vijayamangalam1	Dug Well	282.64	11.24	77.50	19.37	7.65
60	Erode	Pudupalayam1	Dug Well	223.46	11.59	77.59	21.94	7.69
61	Erode	Alampalayam pz	Bore Well	260.00	11.63	77.61	59.20	12.88
62	Erode	Kattupalayam pz	Bore Well	212.00	11.55	77.60	53.65	4.30
63	Namakkal	Sammankadu Elanthankottai	Dug Well	192.00	11.41	77.77	8.50	13.20
64	Namakkal	Singalanadu prm	Dug Well	225.05	11.42	78.30	10.73	14.98
65	Namakkal	Kalinayakkanur	Dug Well	166.50	11.27	78.08	2.15	5.83
66	Namakkal	Ainthu Panai	Dug Well	175.00	11.36	77.81	0.80	2.95
67	Namakkal	Mohanur	Bore Well	121.26	11.06	78.14	0.70	2.75
68	Namakkal	Namakkal1	Bore Well	188.05	11.22	78.17	4.00	5.67
69	Namakkal	Paramarthi dw	Dug Well	147.00	11.16	78.02	1.80	3.13
70	Namakkal	Kattipalayam	Dug Well	198.00	11.32	78.03	10.90	10.85
71	Namakkal	Velur	Dug Well	123.92	11.11	78.00	1.60	1.50
72	Namakkal	Patlur	Dug Well	150.00	11.28	77.81	1.05	0.78

73	Namakkal	Palapati	Dug Well	121.00	11.09	78.08	0.40	0.10
74	Namakkal	K.Naickanpatti	Dug Well	206.80	11.33	78.25	10.58	10.18
75	Namakkal	Annai sathyanagar	Dug Well	155.00	11.35	77.76	1.00	0.35
76	Namakkal	Mohanur1	Dug Well	115.67	11.51	78.14	1.45	0.43
77	Namakkal	Tharagadu Mandavathur	Dug Well	175.00	11.39	77.76	2.50	0.70
78	Namakkal	Velakaundanpatti dw	Dug Well	178.37	11.29	78.07	8.30	6.50
79	Namakkal	Irumbapalam	Dug Well	197.01	11.20	77.99	3.50	1.65
80	Namakkal	Paramarthi	Bore Well	184.32	11.15	78.02	4.55	2.40
81	Namakkal	Kalipatti	Dug Well	122.15	11.52	78.04	10.48	6.28
82	Namakkal	Thiruchengodu	Dug Well	220.00	11.38	77.91	7.88	3.36
83	Namakkal	Namagiripet	Dug Well	257.70	11.46	78.28	14.62	9.92
84	Namakkal	Vennandur	Dug Well	242.60	11.51	78.10	11.51	6.71
85	Namakkal	Sanarpalayam	Dug Well	165.00	11.42	77.70	6.90	1.90
86	Namakkal	Nallur1	Dug Well	202.63	11.27	77.87	9.80	4.25
87	Namakkal	Chittalandur dw	Dug Well	243.32	11.32	77.92	8.50	2.35
88	Namakkal	Nallurgaundanpalayam	Bore Well	203.05	11.27	77.98	9.70	3.25
89	Namakkal	Elachipalayam new	Dug Well	189.86	11.38	78.01	16.08	9.28
90	Namakkal	Rasipuram1	Dug Well	236.22	11.46	78.23	16.22	8.77
91	Namakkal	Vaiyappamalai	Dug Well	223.66	11.33	78.08	12.43	4.88
92	Namakkal	Pudur Siddhampoondi	Dug Well	155.00	11.24	77.91	9.80	1.10
93	Namakkal	Gurusamipalayam	Bore Well	231.18	11.43	78.13	12.60	3.85
94	Namakkal	Unjanai	Dug Well	215.00	11.35	77.96	16.80	8.00
95	Namakkal	Kumbakkottai	Dug Well	307.00	11.47	78.30	18.50	8.12
96	Nilgiris	Kothagiri	Dug Well	1932.45	11.43	76.86	16.55	17.93
97	Nilgiris	Pykara	Dug Well	2052.82	11.47	76.61	1.66	2.00
98	Nilgiris	Udhagamandalam	Dug Well	2045.45	11.40	76.70	0.97	1.08
99	Nilgiris	Wellington	Dug Well	2089.15	11.38	76.81	1.34	0.98
100	Nilgiris	Mullur	Dug Well	1420.20	11.36	76.91	3.01	2.55
101	Salem	Pulaveri	Dug Well	264.50	11.61	78.11	5.05	9.39
102	Salem	Karumbapatti	Dug Well	215.00	11.58	77.86	4.67	4.79
103	Salem	Idapadi new	Dug Well	204.71	11.58	77.85	1.64	1.74
104	Salem	Elampillai dw	Dug Well	265.00	11.61	78.01	1.06	1.16
105	Salem	Yercaud	Dug Well	1460.00	11.78	78.21	2.27	2.26
106	Salem	S.K.Garden Nathimedi	Dug Well	284.00	11.64	78.13	4.66	4.56
107	Salem	Salem surviellance	Dug Well	279.90	11.66	78.17	3.11	2.89
108	Salem	Masilapalayam dw	Dug Well	278.00	11.81	77.79	4.95	4.70
109	Salem	Nangavalli1	Dug Well	344.21	11.76	77.89	5.25	5.00
110	Salem	Ponnammapet dw	Dug Well	317.00	11.66	78.18	3.25	2.82
111	Salem	Sankaridrug	Dug Well	305.13	11.48	77.87	9.49	8.98

112	Salem	Akkaraikadu	Dug Well	245.00	11.57	78.08	4.19	3.21
113	Salem	Salem Bankhouse	Dug Well	290.13	11.67	78.16	6.27	5.18
114	Salem	Sivadapuram dw	Dug Well	266.00	11.65	78.11	2.10	0.80
115	Salem	Omalur	Dug Well	278.73	11.74	78.04	5.39	4.04
116	Salem	Konganapuram dw	Dug Well	230.00	11.57	77.90	6.11	4.70
117	Salem	Mamudi	Dug Well	218.00	11.53	78.05	4.24	2.55
118	Salem	Veerapandi dw	Dug Well	248.00	11.57	78.07	8.45	6.67
119	Salem	Vedukathampatty dw	Dug Well	279.00	11.65	78.08	5.35	2.48
120	Salem	Seshanchavadi	Dug Well	326.00	11.66	78.34	15.29	12.22
121	Salem	Dhasanaickanpatty dw	Dug Well	265.00	11.61	78.15	6.50	3.41
122	Salem	Konganapuram	Bore Well	233.42	11.57	77.90	7.00	3.80
123	Salem	Mallur1	Dug Well	272.83	11.54	78.15	6.70	3.48
124	Salem	Ayodhyapattinam	Dug Well	314.00	11.67	78.24	10.38	7.00
125	Salem	Tivettipatti	Dug Well	346.28	11.87	78.09	11.63	7.26
126	Salem	Jalakandapuram	Dug Well	282.26	11.71	77.87	6.30	1.22
127	Salem	Attayampatti S.Puram	Dug Well	256.45	11.53	78.08	5.73	0.38
128	Salem	Attayampatti Ghss	Dug Well	256.00	11.53	78.08	13.30	7.76
129	Salem	Sukkamppatti	Dug Well	354.49	11.72	78.28	13.00	6.34
130	Salem	Sevantampatti	Dug Well	244.00	11.56	78.09	9.90	3.14
131	Salem	Pincheyai Kodu	Dug Well	270.00	11.59	78.11	16.85	0.77
132	Salem	Panamarathupatti2	Dug Well	284.10	11.59	78.19	24.95	8.59

Annexure-III: The details of Chemical quality of groundwater

Sl No	Station Name	District	Latitude DD	Longitude DD	Ec in micro mohs/cm at 25 deg C	Chloride (mg/l)	Nitrate (mg/l)	Fluoride (mg/l)
1	Karamadai	Coimbatore	11.25	77.21	1442.00	184.34	6.82	0.66
2	Pongalur1	Coimbatore	11.30	77.13	1437.00	177.25	49.60	0.55
3	P.N.palayam	Coimbatore	11.21	76.99	1720.00	225.00	19.00	0.80
4	P.N.palayam	Coimbatore	11.21	76.99	1606.00	173.71	12.40	0.82
5	Ammapet2	Erode	11.62	77.74	1527.00	301.75	1.20	2.29
6	Guvuar dw	Erode	11.64	77.68	1870.00	372.75	76.35	0.66
7	Krishnapuram	Erode	11.54	77.71	981.00	142.00	44.90	0.39
8	Punnachipudur dw	Erode	11.59	77.67	4530.00	763.25	133.00	1.98
9	Attani	Erode	11.52	77.52	1375.00	195.25	96.55	0.87
10	Bhavani1	Erode	11.81	77.53	3070.00	514.75	142.90	1.42
11	Pudupalayam1	Erode	11.59	77.59	2590.00	337.25	111.25	0.73
12	Chennimalai2	Erode	11.16	77.60	1310.00	248.50	48.15	2.10
13	Vellodu	Erode	11.24	77.66	1322.00	142.00	49.20	1.35
14	Chittodu	Erode	11.39	77.68	1899.00	213.00	145.40	1.10
15	Erode2	Erode	11.33	77.73	980.00	159.75	13.30	1.16
16	Kolappalur1	Erode	11.38	77.43	2160.00	390.50	7.40	0.73
17	Archalur	Erode	11.16	77.70	706.00	35.50	49.85	1.42
18	Nasiyanur	Erode	11.34	77.59	903.00	106.50	20.75	0.60
19	Perundurai1	Erode	11.28	77.58	1454.00	213.00	54.45	0.70
20	Vijayamangalam1	Erode	11.24	77.50	1121.00	248.50	129.70	0.87
21	Indiampalayam	Erode	11.45	77.27	1272.00	177.50	26.20	1.42
22	Rajanagaram	Erode	11.55	77.14	889.00	195.25	2.55	0.54
23	Adachapalayam	Erode	11.52	77.47	918.00	124.25	59.95	0.53
24	Bangalapudhur	Erode	11.50	77.41	507.00	85.00	5.55	1.81
25	Kasipalayam	Erode	11.46	77.34	5270.00	1446.36	74.40	0.71
26	Kasipalayam	Erode	11.46	77.34	731.00	149.00	24.05	1.01
27	Elachipalayam1	Namakkal	11.38	78.01	7180.00	1863.75	21.30	0.77
28	Kattipalayam	Namakkal	11.32	78.03	1663.00	284.00	72.15	0.44
29	Unjanai	Namakkal	11.35	77.96	2910.00	745.50	97.50	0.99
30	V.G.Patti	Namakkal	11.29	78.07	5420.00	1331.25	59.45	1.59
31	Vaiyappamalai	Namakkal	11.33	78.08	1656.00	230.75	117.40	0.36
32	Pudur Siddhampoondi	Namakkal	11.24	77.91	1213.00	248.50	0.00	0.86
33	Kalipatti	Namakkal	11.52	78.04	986.00	159.75	101.35	0.34
34	Palapati	Namakkal	11.09	78.08	1422.00	266.25	5.00	0.18
35	Thoppur	Namakkal	11.10	78.15	2460.00	508.00	166.60	0.29
36	Thoppur	Namakkal	11.10	78.15	3190.00	798.75	80.05	1.02
37	Namagiripet	Namakkal	11.46	78.28	930.00	154.00	30.20	0.62

38	Namakkal2	Namakkal	11.22	78.17	960.00	71.00	38.65	0.52
39	Annai sathyanagar	Namakkal	11.35	77.76	934.00	124.25	4.55	1.87
40	Sammankadu Elanthankottai	Namakkal	11.41	77.77	1143.00	124.25	72.45	0.68
41	Sanarpalayam	Namakkal	11.42	77.70	972.00	124.25	57.50	0.74
42	Sanarpalayam	Namakkal	11.42	77.70	3680.00	940.75	3.15	1.52
43	Tharagadu Mandavathur	Namakkal	11.39	77.76	1052.00	124.25	52.25	1.26
44	Senthamangalam	Namakkal	11.30	78.23	1296.00	159.75	131.15	0.69
45	Rasipuram1	Namakkal	11.46	78.23	1319.00	195.25	92.60	0.72
46	Rasipuram1	Namakkal	11.46	78.23	1865.00	319.50	28.50	0.76
47	K.Naickanpatti	Namakkal	11.33	78.25	1070.00	159.75	41.85	0.94
48	Ainthu Panai	Namakkal	11.36	77.81	2600.00	284.00	174.10	1.25
49	Chittalandur dw	Namakkal	11.32	77.92	3610.00	603.50	181.00	0.59
50	Nallur1	Namakkal	11.27	77.87	3200.00	621.25	125.95	0.80
51	Patlur	Namakkal	11.28	77.81	756.00	106.50	0.50	0.68
52	Thiruchengodu	Namakkal	11.38	77.91	1653.00	372.75	94.00	0.51
53	Gurusamipalayam	Namakkal	11.43	78.13	3230.00	656.75	104.65	1.06
54	Mohanur1	Namakkal	11.51	78.14	2180.00	213.00	106.55	1.15
55	Vennandur	Namakkal	11.51	78.10	1756.00	301.75	114.20	1.30
56	Idapadi new	Salem	11.58	77.85	1030.00	190.00	43.00	1.78
57	Nangavalli1	Salem	11.76	77.89	1230.00	180.00	64.00	0.65
58	Omalur	Salem	11.74	78.04	5530.00	760.00	250.00	0.77
59	Mallur1	Salem	11.54	78.15	1950.00	396.00	135.00	0.65
60	Papparapatti	Salem	11.53	78.05	1809.00	254.00	34.10	1.06
61	S.K.Garden Nathimedi	Salem	11.64	78.13	2020.00	457.00	159.00	1.90
62	Salem Bankhouse	Salem	11.67	78.16	1260.00	120.00	24.00	1.45
63	Sivadapuram dw	Salem	11.65	78.11	2090.00	726.00	74.00	1.60
64	Akkaraikadu	Salem	11.57	78.08	6750.00	1428.00	38.00	1.46
65	Attayampatti Ghss	Salem	11.53	78.08	3500.00	750.00	78.00	0.76
66	Mamudi	Salem	11.53	78.05	4070.00	710.00	56.00	0.75
67	Palampatti	Salem	11.57	78.07	4710.00	765.00	57.00	0.63
68	Pulaveri	Salem	11.61	78.11	9850.00	1242.00	28.00	0.91
69	Sevantampatti	Salem	11.56	78.09	6870.00	625.00	17.00	0.89
70	Yercaud	Salem	11.78	78.21	385.00	56.00	22.00	0.54

Annexure-IV: The location of ARS proposed in the basin

Sl.no	TYPE OF ARS	LONGITUDE (DD)	LATITUDE (DD)	VILLAGE NAME	FIRKA NAME
1	CHECKDAM	77.103	11.301	Akkaraisengapalli	ANNUR(N)
2	CHECKDAM	77.077	11.325	Akkaraisengapalli	ANNUR(N)
3	CHECKDAM	77.182	11.474	Akkaraithathapalli	BHAVANISAGAR
4	CHECKDAM	77.160	11.271	Allapalayam	ANNUR(N)
5	CHECKDAM	77.134	11.317	Ambodi	ANNUR(N)
6	CHECKDAM	76.777	11.117	Anaikatti (north)	PERIANAICKENPALAYAM
7	CHECKDAM	77.090	11.398	Ayyampalayam	BHAVANISAGAR
8	CHECKDAM	77.002	11.213	Bilichi	PERIANAICKENPALAYAM
9	CHECKDAM	76.965	11.209	Bilichi	PERIANAICKENPALAYAM
10	CHECKDAM	77.580	11.543	Brammadesam	Athani(E)
11	CHECKDAM	77.862	11.655	Chettimankurichi	EDAPPADI
12	CHECKDAM	77.836	11.473	Chinnakavundanur A/c	SANKARI WEST
13	CHECKDAM	77.815	11.693	Chittur	POOLAMPATTI
14	CHECKDAM	77.847	11.526	Devanakavandanur A/b	SANKARI EAST
15	CHECKDAM	77.673	11.362	Ellapalayam	ERODE NORTH
16	CHECKDAM	77.986	11.550	Eranapuram	ERNAPURAM
17	CHECKDAM	76.933	11.183	Gudalur	PERIANAICKENPALAYAM
18	CHECKDAM	76.931	11.160	Gudalur	PERIANAICKENPALAYAM
19	CHECKDAM	76.918	11.125	Gudalur	PERIANAICKENPALAYAM
20	CHECKDAM	76.921	11.193	Gudalur	PERIANAICKENPALAYAM
21	CHECKDAM	76.937	11.199	Gudalur	PERIANAICKENPALAYAM
22	CHECKDAM	77.930	11.784	Guttapatti	POTTANERI
23	CHECKDAM	77.275	11.377	Irugalur	ELATHUR(E)
24	CHECKDAM	78.264	11.406	Kalkurchi	KALAPPANAIKANPATTI
25	CHECKDAM	77.703	11.706	Kannamuchi	PALAMALAI
26	CHECKDAM	78.192	11.689	Kannankurichi A/b	SALEM_TOWN
27	CHECKDAM	77.178	11.353	Karapadi	PUNJAIPULIAMPATTI
28	CHECKDAM	77.199	11.348	Karapadi	PUNJAIPULIAMPATTI
29	CHECKDAM	77.728	11.313	KASIPALAIYAM	ERODE EAST
30	CHECKDAM	77.232	11.372	Kavilipalayam	PUNJAIPULIAMPATTI
31	CHECKDAM	77.969	11.454	Koothanatham	MALLASAMUDRAM
32	CHECKDAM	78.198	11.794	Kunumbalapatti(r.f.)	OMALUR
33	CHECKDAM	77.052	11.288	Kuppanur	ANNUR(N)
34	CHECKDAM	78.285	11.737	Kuppanur	VALASAIYUR
35	CHECKDAM	77.342	11.402	Kurumandur	ELATHUR(E)

36	CHECKDAM	77.158	11.365	Madampalayam	PUNJAIPULIAMPATTI
37	CHECKDAM	78.258	11.666	Minnampalli	KARIPPATTI
38	CHECKDAM	77.193	11.244	Muriandampalayam	CHEYUR
39	CHECKDAM	77.545	11.554	Nagalur	Athani(E)
40	CHECKDAM	76.909	11.145	Naickenpalayam	PERIANAICKENPALAYAM
41	CHECKDAM	76.906	11.156	Naickenpalayam	PERIANAICKENPALAYAM
42	CHECKDAM	77.325	11.376	Nambiyur	NAMBIYUR
43	CHECKDAM	77.783	11.642	Nedungulam	POOLAMPATTI
44	CHECKDAM	78.039	11.728	Pachanampatti	OMALUR
45	CHECKDAM	77.758	11.766	Palamalai	PALAMALAI
46	CHECKDAM	77.143	11.385	Panayampalli	BHAVANISAGAR
47	CHECKDAM	78.080	11.841	Pannapatti	SEMMANDAPPATTI
48	CHECKDAM	77.243	11.254	Papankulam	CHEYUR
49	CHECKDAM	77.048	11.262	Pogalur	ANNUR(N)
50	CHECKDAM	77.156	11.299	Pongalur	ANNUR(N)
51	CHECKDAM	77.128	11.298	Pongalur	ANNUR(N)
52	CHECKDAM	77.156	11.299	Pongalur	CHEYUR
53	CHECKDAM	77.128	11.298	Pongalur	CHEYUR
54	CHECKDAM	78.227	11.488	Pudur Malayampatti	RASIPURAM
55	CHECKDAM	77.177	11.314	Punjaipuliampatti A/b	PUNJAIPULIAMPATTI
56	CHECKDAM	77.425	11.339	Santhipalayam	NAMBIYUR
57	CHECKDAM	78.229	11.422	Singalandapuram A/d	RASIPURAM
58	CHECKDAM	76.881	11.129	Thadagam R.f.	PERIANAICKENPALAYAM
59	CHECKDAM	76.893	11.187	Thadagam R.f.	PERIANAICKENPALAYAM
60	CHECKDAM	76.873	11.169	Thadagam R.f.	PERIANAICKENPALAYAM
61	CHECKDAM	76.880	11.178	Thadagam R.f.	PERIANAICKENPALAYAM
62	CHECKDAM	76.860	11.178	Thadagam R.f.	PERIANAICKENPALAYAM
63	CHECKDAM	76.857	11.148	Thadagam R.f.	PERIANAICKENPALAYAM
64	CHECKDAM	76.846	11.136	Thadagam R.f.	PERIANAICKENPALAYAM
65	CHECKDAM	76.835	11.140	Thadagam R.f.	PERIANAICKENPALAYAM
66	CHECKDAM	76.819	11.131	Thadagam R.f.	PERIANAICKENPALAYAM
67	CHECKDAM	76.791	11.077	Thadagam R.f.	PERIANAICKENPALAYAM
68	CHECKDAM	76.886	11.109	Thadagam R.f.	PERIANAICKENPALAYAM
69	CHECKDAM	77.193	11.390	Thatchaperumapalayam	PUNJAIPULIAMPATTI
70	CHECKDAM	77.271	11.297	Thathanur	CHEYUR
71	CHECKDAM	78.209	11.571	Tippampatti	PANAMARATHUPPATTI
72	CHECKDAM	78.219	11.699	Vedapatti	VALASAIYUR
73	CHECKDAM	76.781	11.102	Veerapandi	PERIANAICKENPALAYAM
74	CHECKDAM	76.840	11.100	Veerapandi	PERIANAICKENPALAYAM
75	CHECKDAM	77.227	11.311	Vemandampalayam	ELATHUR(E)

76	CHECKDAM	77.237	11.302	Vemandampalayam	ELATHUR(E)
77	NALABUND	78.303	11.745	Achanguttaipatti	VALASAIYUR
78	NALABUND	78.304	11.767	Achanguttapattipudur	VALASAIYUR
79	NALABUND	78.259	11.558	Adimalaipatti	PANAMARATHUPPATTI
80	NALABUND	77.197	11.483	Akkarainegamam	SATHYAMANGALAM
81	NALABUND	77.077	11.336	Akkaraisengapalli	ANNUR(N)
82	NALABUND	77.090	11.328	Akkaraisengapalli	ANNUR(N)
83	NALABUND	78.150	11.691	ALAGAPURAM	SURAMANGALAM
84	NALABUND	77.180	11.285	Alathur	CHEYUR
85	NALABUND	77.163	11.308	Alathur	CHEYUR
86	NALABUND	77.775	11.487	Alathur	SANKARI WEST
87	NALABUND	77.162	11.254	Allapalayam	ANNUR(N)
88	NALABUND	77.153	11.262	Allapalayam	ANNUR(N)
89	NALABUND	77.120	11.311	Ambodi	ANNUR(N)
90	NALABUND	77.143	11.320	Ambodi	ANNUR(N)
91	NALABUND	78.219	11.636	AMMAPETTAI SOUTH	SALEM_TOWN
92	NALABUND	78.204	11.627	AMMAPETTAI SOUTH	SALEM_TOWN
93	NALABUND	76.776	11.082	Anaikatti (south)	PERIANAICKENPALAYAM
94	NALABUND	76.755	11.066	Anaikatti (south)	PERIANAICKENPALAYAM
95	NALABUND	76.770	11.087	Anaikatti (south)	PERIANAICKENPALAYAM
96	NALABUND	76.780	11.091	Anaikatti (south)	PERIANAICKENPALAYAM
97	NALABUND	77.295	11.408	Andipalayam	ELATHUR(E)
98	NALABUND	77.296	11.412	Andipalayam	ELATHUR(E)
99	NALABUND	77.270	11.352	Anjanur	ELATHUR(E)
100	NALABUND	77.287	11.359	Anjanur	ELATHUR(E)
101	NALABUND	77.119	11.287	Annur Mettupalayam	ANNUR(N)
102	NALABUND	77.117	11.261	Annur Mettupalayam	ANNUR(N)
103	NALABUND	78.318	11.719	Anuppur	KARIPPATTI
104	NALABUND	78.338	11.695	Anuppur	KARIPPATTI
105	NALABUND	78.314	11.766	Aramanur	VALASAIYUR
106	NALABUND	78.309	11.756	Aramanur	VALASAIYUR
107	NALABUND	77.979	11.813	Aranganur	MECHERI
108	NALABUND	78.135	11.101	Ariyur	MOHANUR
109	NALABUND	78.144	11.091	Ariyur	MOHANUR
110	NALABUND	77.517	11.532	Athani	Athani(E)
111	NALABUND	77.503	11.539	Athani	Athani(E)
112	NALABUND	78.181	11.841	Attur Chat (r.f.)	YERCAUD
113	NALABUND	77.870	11.724	Avadattur A/b	NANGAVALLI
114	NALABUND	77.397	11.339	Avalampalayam	NAMBIYUR
115	NALABUND	77.084	11.402	Ayyampalayam	BHAVANISAGAR

116	NALABUND	77.188	11.508	Baguthampalayam	BHAVANISAGAR
117	NALABUND	78.262	11.365	Belukkurichi A/b	KALAPPANAIKANPATTI
118	NALABUND	78.265	11.373	Belukkurichi A/b	KALAPPANAIKANPATTI
119	NALABUND	76.945	11.207	Bilichi	PERIANAICKENPALAYAM
120	NALABUND	76.996	11.226	Bilichi	PERIANAICKENPALAYAM
121	NALABUND	76.984	11.206	Bilichi	PERIANAICKENPALAYAM
122	NALABUND	76.973	11.199	Bilichi	PERIANAICKENPALAYAM
123	NALABUND	76.961	11.225	Bilichi	PERIANAICKENPALAYAM
124	NALABUND	77.004	11.204	Bilichi	PERIANAICKENPALAYAM
125	NALABUND	77.009	11.222	Bilichi	PERIANAICKENPALAYAM
126	NALABUND	77.202	11.465	Boosaripalayam	BHAVANISAGAR
127	NALABUND	77.189	11.472	Boosaripalayam	BHAVANISAGAR
128	NALABUND	77.184	11.459	Boosaripalayam	BHAVANISAGAR
129	NALABUND	77.639	11.701	Chennampatti	AMMAPETTAI
130	NALABUND	77.901	11.065	Chennasamudram	KODUMUDI
131	NALABUND	77.558	11.185	Chennimalai A/b	CHENNIMALAI
132	NALABUND	78.175	11.734	Chettichavadi	SURAMANGALAM
133	NALABUND	77.932	11.753	Chinnasoragai	NANGAVALLI
134	NALABUND	76.850	11.096	Chinnathadagam	THUDIALUR
135	NALABUND	77.835	11.676	Chittur	POOLAMPATTI
136	NALABUND	78.148	11.853	Danishpet	KADAYAMPATTI
137	NALABUND	78.162	11.852	Danishpet	KADAYAMPATTI
138	NALABUND	78.171	11.900	Danishpet	KADAYAMPATTI
139	NALABUND	78.142	11.892	Danishpet	KADAYAMPATTI
140	NALABUND	78.169	11.895	Danishpet	KADAYAMPATTI
141	NALABUND	78.167	11.893	Danishpet	KADAYAMPATTI
142	NALABUND	78.174	11.923	Danishpet	KADAYAMPATTI
143	NALABUND	78.156	11.880	Danishpet	KADAYAMPATTI
144	NALABUND	78.135	11.836	Danishpet	KADAYAMPATTI
145	NALABUND	78.004	11.656	Desavilakku A/b	THARAMANGALAM
146	NALABUND	77.999	11.671	Desavilakku A/b	THARAMANGALAM
147	NALABUND	77.861	11.576	Devanakavandanur A/b	SANKARI EAST
148	NALABUND	78.030	11.619	Edanagansalai	ERNAPURAM
149	NALABUND	77.311	11.407	Elathur	ELATHUR(E)
150	NALABUND	77.306	11.377	Elathur	ELATHUR(E)
151	NALABUND	77.321	11.402	Elathur	ELATHUR(E)
152	NALABUND	77.763	11.175	Elumathur A/b	MODAKURICHI
153	NALABUND	77.781	11.208	Elumathur A/b	MODAKURICHI
154	NALABUND	77.316	11.331	Emmampoondi	NAMBIYUR
155	NALABUND	77.316	11.314	Emmampoondi	NAMBIYUR

156	NALABUND	77.315	11.297	Emmampoondi	NAMBIYUR
157	NALABUND	77.291	11.294	Emmampoondi	NAMBIYUR
158	NALABUND	77.305	11.296	Emmampoondi	NAMBIYUR
159	NALABUND	77.997	11.548	Eranapuram	ERNAPURAM
160	NALABUND	77.746	11.341	ERODE	ERODE EAST
161	NALABUND	77.905	11.573	Erumaipatti	KONGANAPURAM
162	NALABUND	77.098	11.428	Forest	BHAVANISAGAR
163	NALABUND	77.102	11.411	Forest	BHAVANISAGAR
164	NALABUND	77.452	11.289	Ganapathipalayam	KUNNATHUR
165	NALABUND	77.679	11.374	Gangapuram	ERODE NORTH
166	NALABUND	77.662	11.380	Gangapuram	ERODE NORTH
167	NALABUND	77.655	11.363	Gangapuram	ERODE NORTH
168	NALABUND	77.263	11.405	Gudakkarai	ELATHUR(E)
169	NALABUND	76.918	11.178	Gudalur	PERIANAICKENPALAYAM
170	NALABUND	76.919	11.172	Gudalur	PERIANAICKENPALAYAM
171	NALABUND	76.922	11.205	Gudalur	PERIANAICKENPALAYAM
172	NALABUND	76.914	11.185	Gudalur	PERIANAICKENPALAYAM
173	NALABUND	78.211	11.739	Gundur	YERCAUD
174	NALABUND	77.898	11.800	Guttapatti	POTTANERI
175	NALABUND	78.269	11.415	Ichchampatti	KALAPPANAIKANPATTI
176	NALABUND	77.831	11.632	IDAPPADI	EDAPPADI
177	NALABUND	77.861	11.680	Idupali	EDAPPADI
178	NALABUND	77.155	11.499	Ikkaraithathapalli	BHAVANISAGAR
179	NALABUND	77.167	11.496	Ikkaraithathapalli	BHAVANISAGAR
180	NALABUND	77.177	11.499	Ikkaraithathapalli	BHAVANISAGAR
181	NALABUND	77.594	11.215	Ingur	VELLODE
182	NALABUND	77.814	11.218	Injampalli B	MODAKURICHI
183	NALABUND	77.800	11.197	Injampalli B	MODAKURICHI
184	NALABUND	77.270	11.363	Irugalur	ELATHUR(E)
185	NALABUND	77.285	11.374	Irugalur	ELATHUR(E)
186	NALABUND	78.039	11.243	Iruttanai A/b	NALLUR(N)
187	NALABUND	77.887	11.710	JALAKANDAPURAM	NANGAVALLI
188	NALABUND	78.253	11.600	Jalluthuppatti	PANAMARATHUPPATTI
189	NALABUND	78.133	11.896	Kadayampatti A/c	KADAYAMPATTI
190	NALABUND	78.222	11.391	Kadiranallur	PUDUCHATRAM
191	NALABUND	78.185	11.891	Kanavoipudur	KADAYAMPATTI
192	NALABUND	78.195	11.928	Kanavoipudur	KADAYAMPATTI
193	NALABUND	77.720	11.732	Kannamuchi	PALAMALAI
194	NALABUND	77.722	11.768	Kannamuchi	PALAMALAI
195	NALABUND	77.183	11.271	Kanur	CHEYUR

196	NALABUND	77.189	11.260	Kanur	CHEYUR
197	NALABUND	77.117	11.326	Kanuvakkarai	ANNUR(N)
198	NALABUND	77.106	11.325	Kanuvakkarai	ANNUR(N)
199	NALABUND	77.499	11.276	Karandipalayam	PERUNDURAI
200	NALABUND	77.181	11.360	Karapadi	PUNJAIPULIAMPATTI
201	NALABUND	77.209	11.360	Karapadi	PUNJAIPULIAMPATTI
202	NALABUND	77.200	11.364	Karapadi	PUNJAIPULIAMPATTI
203	NALABUND	77.195	11.353	Karapadi	PUNJAIPULIAMPATTI
204	NALABUND	77.323	11.431	Karattupalayam	ELATHUR(E)
205	NALABUND	77.333	11.431	Karattupalayam	ELATHUR(E)
206	NALABUND	77.356	11.441	Karattupalayam	ELATHUR(E)
207	NALABUND	77.368	11.423	Karattupalayam	ELATHUR(E)
208	NALABUND	77.346	11.436	Karattupalayam	ELATHUR(E)
209	NALABUND	77.161	11.447	Karidoddampalayam	BHAVANISAGAR
210	NALABUND	77.171	11.457	Karidoddampalayam	BHAVANISAGAR
211	NALABUND	78.281	11.645	Karipatti	KARIPPATTI
212	NALABUND	77.592	11.293	Karumandi Chellipalayam	PERUNDURAI
213	NALABUND	78.291	11.656	Karumapuram	KARIPPATTI
214	NALABUND	77.700	11.298	KASIPALAIYAM	ERODE EAST
215	NALABUND	78.294	11.759	Kathiripatti	VALASAIYUR
216	NALABUND	77.207	11.393	Kavilipalayam	PUNJAIPULIAMPATTI
217	NALABUND	78.056	11.164	Kilsathambur	NALLIPALAYAM
218	NALABUND	77.984	11.284	Kolaram	NALLUR(N)
219	NALABUND	78.228	11.584	Konamaduvu	PANAMARATHUPPATTI
220	NALABUND	77.925	11.632	Konasamudram	KONGANAPURAM
221	NALABUND	77.351	11.386	Koshanam	NAMBIYUR
222	NALABUND	77.342	11.379	Koshanam	NAMBIYUR
223	NALABUND	77.534	11.265	Kullampalayam	PERUNDURAI
224	NALABUND	77.662	11.405	Kumilamparappu	ERODE NORTH
225	NALABUND	77.958	11.231	Kunnamalai	PARAMATHI
226	NALABUND	78.180	11.791	Kunumbalapatti(r.f.)	OMALUR
227	NALABUND	78.176	11.784	Kunumbalapatti(r.f.)	OMALUR
228	NALABUND	78.169	11.768	Kunumbalapatti(r.f.)	OMALUR
229	NALABUND	78.188	11.766	Kunumbalapatti(r.f.)	OMALUR
230	NALABUND	78.182	11.753	Kunumbalapatti(r.f.)	OMALUR
231	NALABUND	78.193	11.730	Kunumbalapatti(r.f.)	OMALUR
232	NALABUND	78.187	11.715	Kunumbalapatti(r.f.)	OMALUR
233	NALABUND	77.549	11.512	Kuppandampalayam	Athani(E)
234	NALABUND	77.081	11.305	Kuppanur	ANNUR(N)
235	NALABUND	77.068	11.308	Kuppanur	ANNUR(N)

236	NALABUND	77.058	11.304	Kuppanur	ANNUR(N)
237	NALABUND	77.074	11.287	Kuppanur	ANNUR(N)
238	NALABUND	77.069	11.267	Kuppanur	ANNUR(N)
239	NALABUND	77.056	11.316	Kuppanur	ANNUR(N)
240	NALABUND	78.289	11.726	Kuppanur	VALASAIYUR
241	NALABUND	76.910	11.105	KURUDAMPALAIYAM	PERIANAICKENPALAYAM
242	NALABUND	76.915	11.109	KURUDAMPALAIYAM	PERIANAICKENPALAYAM
243	NALABUND	77.348	11.418	Kurumandur	ELATHUR(E)
244	NALABUND	77.351	11.395	Kurumandur	ELATHUR(E)
245	NALABUND	77.169	11.417	Kurumbapalayam	PUNJAIPULIAMPATTI
246	NALABUND	77.173	11.425	Kurumbapalayam	PUNJAIPULIAMPATTI
247	NALABUND	77.209	11.314	Kuttagam	CHEYUR
248	NALABUND	77.215	11.340	Kuttagam	CHEYUR
249	NALABUND	77.203	11.323	Kuttagam	CHEYUR
250	NALABUND	77.203	11.332	Kuttagam	CHEYUR
251	NALABUND	77.216	11.324	Kuttagam	CHEYUR
252	NALABUND	78.321	11.704	Kuttathipatti	KARIPPATTI
253	NALABUND	77.227	11.335	Lagampalayam	ELATHUR(E)
254	NALABUND	78.053	11.627	Luguvanpatti	THIRUMALAIGIRI
255	NALABUND	77.153	11.352	Madampalayam	PUNJAIPULIAMPATTI
256	NALABUND	77.144	11.357	Madampalayam	PUNJAIPULIAMPATTI
257	NALABUND	78.254	11.506	Malayampatti	NAMAGIRIPETTAI
258	NALABUND	78.202	11.543	Mallur Rf	VENNANDUR
259	NALABUND	78.191	11.537	Mallur Rf	VENNANDUR
260	NALABUND	78.234	11.540	Mallur Rf	VENNANDUR
261	NALABUND	78.230	11.525	Mallur Rf	VENNANDUR
262	NALABUND	78.220	11.507	Mallur Rf	VENNANDUR
263	NALABUND	78.205	11.521	Mallur Rf	VENNANDUR
264	NALABUND	78.020	11.524	Mangalam	MALLASAMUDRAM
265	NALABUND	77.195	11.299	Mangarasavalayapalayam	CHEYUR
266	NALABUND	77.193	11.312	Mangarasavalayapalayam	CHEYUR
267	NALABUND	77.189	11.325	Mangarasavalayapalayam	CHEYUR
268	NALABUND	77.184	11.336	Mangarasavalayapalayam	CHEYUR
269	NALABUND	78.232	11.638	Masinayakkampatti	KARIPPATTI
270	NALABUND	77.298	11.327	Mettanam	NAMBIYUR
271	NALABUND	78.318	11.654	Mettupatti	KARIPPATTI
272	NALABUND	78.304	11.642	Mettupatti	KARIPPATTI
273	NALABUND	78.272	11.681	Minnampalli	KARIPPATTI
274	NALABUND	77.776	11.254	Modakurichi	MODAKURICHI
275	NALABUND	78.145	11.046	Mohanur	MOHANUR

276	NALABUND	78.275	11.746	Mookkanur	VALASAIYUR
277	NALABUND	77.221	11.252	Muriandampalayam	CHEYUR
278	NALABUND	77.207	11.242	Muriandampalayam	CHEYUR
279	NALABUND	77.649	11.149	Murugatholuvu	CHENNIMALAI
280	NALABUND	77.977	11.192	Nadandai	PARAMATHI
281	NALABUND	77.545	11.570	Nagalur	Athani(E)
282	NALABUND	77.532	11.578	Nagalur	Athani(E)
283	NALABUND	76.893	11.144	Naickenpalayam	PERIANAICKENPALAYAM
284	NALABUND	77.166	11.382	Nallur	PUNJAIPULIAMPATTI
285	NALABUND	77.178	11.383	Nallur	PUNJAIPULIAMPATTI
286	NALABUND	77.330	11.365	Nambiyur	NAMBIYUR
287	NALABUND	77.324	11.351	Nambiyur	NAMBIYUR
288	NALABUND	77.998	11.082	Nanjaipugalur	PUGALUR
289	NALABUND	76.881	11.094	Nanjundapuram	THUDIALUR
290	NALABUND	76.881	11.094	Nanjundapuram	THUDIALUR
291	NALABUND	76.917	11.118	NARASIMHANAYAKKANPALAIYAM	PERIANAICKENPALAYAM
292	NALABUND	77.419	11.319	Nichampalayam	NAMBIYUR
293	NALABUND	78.168	11.601	Nilavarapatti A/b	PANAMARATHUPPATTI
294	NALABUND	77.526	11.301	Nimittipalayam	PERUNDURAI
295	NALABUND	78.359	11.706	Nirmullikuttai	BELUR
296	NALABUND	78.348	11.700	Nirmullikuttai	BELUR
297	NALABUND	78.236	11.560	Nuleathukombai	PANAMARATHUPPATTI
298	NALABUND	77.515	11.423	Odathurai	KAVANDAPADI
299	NALABUND	77.071	11.248	Odderpalayam	ANNUR(N)
300	NALABUND	77.069	11.256	Odderpalayam	ANNUR(N)
301	NALABUND	78.180	11.028	Oraavandur	MOHANUR
302	NALABUND	77.616	11.175	OTTAPPARAI	CHENNIMALAI
303	NALABUND	77.822	11.725	Pakkanadu	POOLAMPATTI
304	NALABUND	77.564	11.307	Palakarai	PERUNDURAI
305	NALABUND	77.554	11.321	Palakarai	PERUNDURAI
306	NALABUND	78.140	11.480	Palanthinnipatti	RASIPURAM
307	NALABUND	78.133	11.462	Palanthinnipatti	RASIPURAM
308	NALABUND	78.128	11.451	Palanthinnipatti	RASIPURAM
309	NALABUND	78.115	11.478	Palanthinnipatti	RASIPURAM
310	NALABUND	77.298	11.348	Palavapalayam	NAMBIYUR
311	NALABUND	77.311	11.347	Palavapalayam	NAMBIYUR
312	NALABUND	77.116	11.425	Panayampalli	BHAVANISAGAR
313	NALABUND	77.138	11.400	Panayampalli	BHAVANISAGAR
314	NALABUND	77.125	11.413	Panayampalli	BHAVANISAGAR
315	NALABUND	77.980	11.632	Pappambadi	THARAMANGALAM

316	NALABUND	77.137	11.274	Pasur	ANNUR(N)
317	NALABUND	77.144	11.284	Pasur	ANNUR(N)
318	NALABUND	77.155	11.278	Pasur	ANNUR(N)
319	NALABUND	77.125	11.281	Pasur	ANNUR(N)
320	NALABUND	77.553	11.273	Pattackarampalayam	PERUNDURAI
321	NALABUND	78.271	11.639	Periyakavundapuram	KARIPPATTI
322	NALABUND	78.252	11.641	Periyakavundapuram	KARIPPATTI
323	NALABUND	78.157	11.219	Periyapatti A/c	NAMAKKAL
324	NALABUND	78.060	11.587	Periyaseeragapadi	VEMBADITHALAM
325	NALABUND	77.915	11.735	Periyasoragai	NANGAVALLI
326	NALABUND	77.492	11.260	Periyaveerasangili	PERUNDURAI
327	NALABUND	77.998	11.725	Periyerippatti	OMALUR
328	NALABUND	77.580	11.261	Perundurai	PERUNDURAI
329	NALABUND	78.042	11.184	Pillakalathur A/b	PARAMATHI
330	NALABUND	77.044	11.276	Pogalur	ANNUR(N)
331	NALABUND	77.141	11.304	Pongalur	ANNUR(N)
332	NALABUND	77.165	11.288	Pongalur	ANNUR(N)
333	NALABUND	77.141	11.304	Pongalur	CHEYUR
334	NALABUND	77.165	11.288	Pongalur	CHEYUR
335	NALABUND	77.255	11.281	Pothampalayam	CHEYUR
336	NALABUND	77.247	11.287	Pothampalayam	CHEYUR
337	NALABUND	77.229	11.289	Pothampalayam	CHEYUR
338	NALABUND	77.843	11.774	Pottaneri Nallagoundampattia/b	Mettur
339	NALABUND	77.731	11.291	Pudur	POONDURAI
340	NALABUND	77.971	11.564	Pudur	ERNAPURAM
341	NALABUND	77.971	11.564	Pudur	ERNAPURAM
342	NALABUND	78.224	11.496	Pudur Malayampatti	RASIPURAM
343	NALABUND	77.801	11.673	Pulampatti	POOLAMPATTI
344	NALABUND	77.796	11.693	Pulampatti	POOLAMPATTI
345	NALABUND	77.764	11.223	Punduraisemur	POONDURAI
346	NALABUND	77.836	11.228	Punjai Kalamangalam A/b	MODAKURICHI
347	NALABUND	77.170	11.341	PUNJAI PULIAMPATTI	PUNJAIPULIAMPATTI
348	NALABUND	77.760	11.300	Punjailakkapuram	MODAKURICHI
349	NALABUND	77.172	11.326	Punjaipuliampatti A/b	PUNJAIPULIAMPATTI
350	NALABUND	78.005	11.434	Ramapuram	VAIYAPPAMALAI
351	NALABUND	78.141	11.691	Reddiyur	SURAMANGALAM
352	NALABUND	77.897	11.677	Samudram	KONGANAPURAM
353	NALABUND	77.409	11.333	Santhipalayam	NAMBIYUR
354	NALABUND	78.317	11.691	Sarkar Nattamangalam	KARIPPATTI
355	NALABUND	77.537	11.303	Seenapuram	PERUNDURAI

356	NALABUND	78.079	11.288	Seiluvampatti A/c	NALLIPALAYAM
357	NALABUND	77.184	11.376	Sellapampalayam	PUNJAIPULIAMPATTI
358	NALABUND	77.957	11.511	Sellappampatti	SANKARI EAST
359	NALABUND	77.432	11.304	Setti Kuttai	KUNNATHUR
360	NALABUND	77.396	11.354	Sinnaipalayam	NAMBIYUR
361	NALABUND	77.388	11.369	Sinnaipalayam	NAMBIYUR
362	NALABUND	77.483	11.261	Sinnavirasangili	PERUNDURAI
363	NALABUND	77.459	11.286	Sinniampalayam	KUNNATHUR
364	NALABUND	78.273	11.719	Sukkampatti	VALASAIYUR
365	NALABUND	77.555	11.287	Sullipalayam	PERUNDURAI
366	NALABUND	77.273	11.407	Sundakkampalayam	ELATHUR(E)
367	NALABUND	77.268	11.421	Sundakkampalayam	ELATHUR(E)
368	NALABUND	77.259	11.428	Sundakkampalayam	ELATHUR(E)
369	NALABUND	77.164	11.408	Sunkakaranpalayam	PUNJAIPULIAMPATTI
370	NALABUND	77.698	11.329	SURAMPATTI	ERODE EAST
371	NALABUND	77.974	11.762	T.maramangalam	OMALUR
372	NALABUND	77.405	11.365	Talguni	NAMBIYUR
373	NALABUND	77.910	11.543	Tangayur	KONGANAPURAM
374	NALABUND	76.868	11.144	Thadagam R.f.	PERIANAICKENPALAYAM
375	NALABUND	76.836	11.127	Thadagam R.f.	PERIANAICKENPALAYAM
376	NALABUND	76.854	11.161	Thadagam R.f.	PERIANAICKENPALAYAM
377	NALABUND	76.835	11.107	Thadagam R.f.	PERIANAICKENPALAYAM
378	NALABUND	76.857	11.109	Thadagam R.f.	PERIANAICKENPALAYAM
379	NALABUND	76.893	11.160	Thadagam R.f.	PERIANAICKENPALAYAM
380	NALABUND	76.896	11.135	Thadagam R.f.	PERIANAICKENPALAYAM
381	NALABUND	76.904	11.124	Thadagam R.f.	PERIANAICKENPALAYAM
382	NALABUND	76.848	11.127	Thadagam R.f.	PERIANAICKENPALAYAM
383	NALABUND	76.873	11.110	Thadagam R.f.	PERIANAICKENPALAYAM
384	NALABUND	76.805	11.091	Thadagam R.f.	PERIANAICKENPALAYAM
385	NALABUND	76.801	11.121	Thadagam R.f.	PERIANAICKENPALAYAM
386	NALABUND	76.798	11.068	Thadagam R.f.	PERIANAICKENPALAYAM
387	NALABUND	76.906	11.193	Thadagam R.f.	PERIANAICKENPALAYAM
388	NALABUND	76.786	11.059	Thadagam R.f.	PERIANAICKENPALAYAM
389	NALABUND	76.825	11.088	Thadagam R.f.	PERIANAICKENPALAYAM
390	NALABUND	76.813	11.083	Thadagam R.f.	PERIANAICKENPALAYAM
391	NALABUND	76.862	11.115	Thadagam R.f.	PERIANAICKENPALAYAM
392	NALABUND	76.859	11.130	Thadagam R.f.	PERIANAICKENPALAYAM
393	NALABUND	76.798	11.129	Thadagam R.f.	PERIANAICKENPALAYAM
394	NALABUND	76.900	11.116	Thadagam R.f.	PERIANAICKENPALAYAM
395	NALABUND	76.900	11.102	Thadagam R.f.	PERIANAICKENPALAYAM

396	NALABUND	76.810	11.102	Thadagam R.f.	PERIANAICKENPALAYAM
397	NALABUND	76.807	11.120	Thadagam R.f.	PERIANAICKENPALAYAM
398	NALABUND	76.872	11.121	Thadagam R.f.	PERIANAICKENPALAYAM
399	NALABUND	76.841	11.113	Thadagam R.f.	PERIANAICKENPALAYAM
400	NALABUND	76.851	11.113	Thadagam R.f.	PERIANAICKENPALAYAM
401	NALABUND	76.882	11.137	Thadagam R.f.	PERIANAICKENPALAYAM
402	NALABUND	76.860	11.139	Thadagam R.f.	PERIANAICKENPALAYAM
403	NALABUND	76.877	11.156	Thadagam R.f.	PERIANAICKENPALAYAM
404	NALABUND	76.867	11.159	Thadagam R.f.	PERIANAICKENPALAYAM
405	NALABUND	76.888	11.160	Thadagam R.f.	PERIANAICKENPALAYAM
406	NALABUND	76.900	11.178	Thadagam R.f.	PERIANAICKENPALAYAM
407	NALABUND	76.849	11.172	Thadagam R.f.	PERIANAICKENPALAYAM
408	NALABUND	76.887	11.173	Thadagam R.f.	PERIANAICKENPALAYAM
409	NALABUND	77.219	11.279	Thandukkarampalayam	CHEYUR
410	NALABUND	77.201	11.267	Thandukkarampalayam	CHEYUR
411	NALABUND	77.192	11.284	Thandukkarampalayam	CHEYUR
412	NALABUND	77.208	11.288	Thandukkarampalayam	CHEYUR
413	NALABUND	77.217	11.286	Thandukkarampalayam	CHEYUR
414	NALABUND	77.279	11.297	Thathanur	CHEYUR
415	NALABUND	77.677	11.230	Thenmugam Vellode	VELLODE
416	NALABUND	77.612	11.231	Thenmugam Vellode	VELLODE
417	NALABUND	78.219	11.346	Thirumalaipatti	PUDUCHATRAM
418	NALABUND	78.133	11.149	Tholur	VALAIYAPATTI
419	NALABUND	77.150	11.457	Thoppampalayam A/b	BHAVANISAGAR
420	NALABUND	77.147	11.432	Thoppampalayam A/b	BHAVANISAGAR
421	NALABUND	77.137	11.443	Thoppampalayam A/b	BHAVANISAGAR
422	NALABUND	78.252	11.584	Thumbalpatti	PANAMARATHUPPATTI
423	NALABUND	78.125	11.251	Thummankurichi A/b	NALLIPALAYAM
424	NALABUND	78.200	11.562	Tippampatti	PANAMARATHUPPATTI
425	NALABUND	78.194	11.560	Tippampatti	PANAMARATHUPPATTI
426	NALABUND	78.276	11.344	Uthiragadikaval	KALAPPANAIKANPATTI
427	NALABUND	77.100	11.288	Vadakkalur	ANNUR(N)
428	NALABUND	77.079	11.277	Vadakkalur	ANNUR(N)
429	NALABUND	77.610	11.269	Vadamugam Vellode A/b	VELLODE
430	NALABUND	77.919	11.473	Vadugapatti	SANKARI EAST
431	NALABUND	77.541	11.197	Varapalayam	VELLODE
432	NALABUND	76.765	11.106	Veerapandi	PERIANAICKENPALAYAM
433	NALABUND	76.770	11.051	Veerapandi	PERIANAICKENPALAYAM
434	NALABUND	76.775	11.069	Veerapandi	PERIANAICKENPALAYAM
435	NALABUND	76.811	11.112	Veerapandi	PERIANAICKENPALAYAM

436	NALABUND	77.704	11.347	VEERAPPANCHATTIRAM	ERODE EAST
437	NALABUND	78.324	11.738	Velampatti	VALASAIYUR
438	NALABUND	78.318	11.734	Velampatti	VALASAIYUR
439	NALABUND	78.299	11.712	Vellaiyanpatti	KARIPPATTI
440	NALABUND	78.287	11.480	Vellakkalpatti	NAMAGIRIPETTAI
441	NALABUND	77.938	11.628	Vellalapuram	KONGANAPURAM
442	NALABUND	78.015	11.110	Velur	PARAMATHI
443	NALABUND	77.255	11.352	Vemandampalayam	ELATHUR(E)
444	NALABUND	77.265	11.323	Vemandampalayam	ELATHUR(E)
445	NALABUND	77.873	11.097	Vengambur	KODUMUDI
446	NALABUND	77.504	11.222	Vijayapuri	PERUNDURAI
447	NALABUND	78.046	11.216	Villipalayam	NALLUR(N)
448	NALABUND	77.191	11.435	Vinnappalli	PUNJAIPULIAMPATTI
449	RECHARGE SHAFT	78.098	11.678	A.ayyamperumalpatti	THIRUMALAIGIRI
450	RECHARGE SHAFT	78.097	11.664	A.ayyamperumalpatti	THIRUMALAIGIRI
451	RECHARGE SHAFT	77.932	11.563	Agraharam Talaiyur	ERNAPURAM
452	RECHARGE SHAFT	77.959	11.531	Agraharam Talaiyur	ERNAPURAM
453	RECHARGE SHAFT	77.928	11.555	Agraharam Talaiyur	ERNAPURAM
454	RECHARGE SHAFT	77.932	11.552	Agraharam Talaiyur	ERNAPURAM
455	RECHARGE SHAFT	78.127	11.389	Agraharanathamangalam	PUDUCHATRAM
456	RECHARGE SHAFT	77.889	11.477	Aiveli	SANKARI EAST
457	RECHARGE SHAFT	77.904	11.478	Aiveli	SANKARI EAST
458	RECHARGE SHAFT	77.895	11.486	Aiveli	SANKARI EAST
459	RECHARGE SHAFT	78.066	11.471	Akkaraipatti A/c	RASIPURAM
460	RECHARGE SHAFT	78.083	11.456	Akkaraipatti A/c	RASIPURAM
461	RECHARGE SHAFT	77.071	11.325	Akkaraisengapalli	ANNUR(N)
462	RECHARGE SHAFT	78.034	11.667	Alagusamudram	THARAMANGALAM
463	RECHARGE SHAFT	78.176	11.438	Anaipalayam	RASIPURAM
464	RECHARGE SHAFT	78.176	11.434	Anaipalayam	RASIPURAM
465	RECHARGE SHAFT	78.163	11.422	Ananthakrishnarayasamudram	RASIPURAM
466	RECHARGE SHAFT	78.111	11.632	Andipatti-sowdapuram	SURAMANGALAM
467	RECHARGE SHAFT	77.910	11.463	Annadanapatti	SANKARI EAST
468	RECHARGE SHAFT	77.915	11.478	Annadanapatti	SANKARI EAST
469	RECHARGE SHAFT	77.911	11.467	Annadanapatti	SANKARI EAST

470	RECHARGE SHAFT	78.156	11.628	ANNADANAPATTI	SURAMANGALAM
471	RECHARGE SHAFT	77.121	11.252	Annur Mettupalayam	ANNUR(N)
472	RECHARGE SHAFT	77.999	11.804	Aranganur	MECHERI
473	RECHARGE SHAFT	77.999	11.798	Aranganur	MECHERI
474	RECHARGE SHAFT	77.512	11.555	Athani	Athani(E)
475	RECHARGE SHAFT	78.126	11.431	Ayeepalayam	RASIPURAM
476	RECHARGE SHAFT	78.248	11.657	Ayodhyapattinam	KARIPPATTI
477	RECHARGE SHAFT	77.987	11.521	Ballakkuli Agraharam A/b	MALLASAMUDRAM
478	RECHARGE SHAFT	77.948	11.795	Banapuram	MECHERI
479	RECHARGE SHAFT	78.235	11.365	Belukkurichi A/b	KALAPPANAIKANPATTI
480	RECHARGE SHAFT	77.590	11.546	Brammadesam	Athani(E)
481	RECHARGE SHAFT	77.597	11.546	Brammadesam	Athani(E)
482	RECHARGE SHAFT	77.844	11.654	Chettimankurichi	EDAPPADI
483	RECHARGE SHAFT	77.829	11.474	Chinnakavundanur A/c	SANKARI WEST
484	RECHARGE SHAFT	77.823	11.466	Chinnakavundanur A/c	SANKARI WEST
485	RECHARGE SHAFT	78.257	11.656	Chinnakavundapuram	KARIPPATTI
486	RECHARGE SHAFT	77.841	11.667	Chittur	POOLAMPATTI
487	RECHARGE SHAFT	78.245	11.708	D.perumalpalayam	VALASAIYUR
488	RECHARGE SHAFT	78.103	11.654	Dalavaipatti	THIRUMALAIGIRI
489	RECHARGE SHAFT	78.125	11.857	Danishpet	KADAYAMPATTI
490	RECHARGE SHAFT	78.138	11.859	Danishpet	KADAYAMPATTI
491	RECHARGE SHAFT	78.084	11.868	Deevattipatti	KADAYAMPATTI
492	RECHARGE SHAFT	77.981	11.661	Desavilakku A/b	THARAMANGALAM
493	RECHARGE SHAFT	77.846	11.563	Devanakavandanur A/b	SANKARI EAST
494	RECHARGE SHAFT	77.853	11.577	Devanakavandanur A/b	SANKARI EAST
495	RECHARGE SHAFT	77.830	11.577	Devanakavandanur A/b	SANKARI EAST
496	RECHARGE SHAFT	77.831	11.574	Devanakavandanur A/b	SANKARI EAST
497	RECHARGE SHAFT	77.994	11.624	Edanagansalai	ERNAPURAM
498	RECHARGE SHAFT	78.004	11.617	Edanagansalai	ERNAPURAM
499	RECHARGE SHAFT	78.036	11.630	Edanagansalai	ERNAPURAM
500	RECHARGE SHAFT	77.964	11.611	Egapuram	ERNAPURAM
501	RECHARGE	77.321	11.387	Elathur	ELATHUR(E)

	SHAFT				
502	RECHARGE SHAFT	78.057	11.544	Ellimanaickampatti	VEMBADITHALAM
503	RECHARGE SHAFT	78.119	11.363	Elur	SELLAPPAMPATTI
504	RECHARGE SHAFT	77.982	11.552	Eranapuram	ERNAPURAM
505	RECHARGE SHAFT	78.098	11.235	Eranapuram A/b	NALLIPALAYAM
506	RECHARGE SHAFT	78.287	11.686	Eripudur	KARIPPATTI
507	RECHARGE SHAFT	78.127	11.568	Errachinnampatti	VEERAPANDI
508	RECHARGE SHAFT	78.114	11.562	Errachinnampatti	VEERAPANDI
509	RECHARGE SHAFT	77.915	11.566	Erumaipatti	KONGANAPURAM
510	RECHARGE SHAFT	78.179	11.624	Erumapalayam A/b	SALEM_TOWN
511	RECHARGE SHAFT	77.949	11.497	Gedikaval	ERNAPURAM
512	RECHARGE SHAFT	77.951	11.500	Gedikaval	ERNAPURAM
513	RECHARGE SHAFT	77.952	11.498	Gedikaval	ERNAPURAM
514	RECHARGE SHAFT	78.021	11.540	Gudalur	ERNAPURAM
515	RECHARGE SHAFT	77.863	11.692	Idupali	EDAPPADI
516	RECHARGE SHAFT	77.872	11.683	Idupali	EDAPPADI
517	RECHARGE SHAFT	77.953	11.500	Irugalur	SANKARI EAST
518	RECHARGE SHAFT	77.950	11.473	Irugur Pudupalayam	SANKARI EAST
519	RECHARGE SHAFT	77.968	11.472	Irugur Pudupalayam	SANKARI EAST
520	RECHARGE SHAFT	78.138	11.620	JARIKONDALAMPATTI	SURAMANGALAM
521	RECHARGE SHAFT	77.925	11.594	Kachchippalli	KONGANAPURAM
522	RECHARGE SHAFT	77.959	11.591	Kachchippalli	KONGANAPURAM
523	RECHARGE SHAFT	78.077	11.551	Kadathur Agraharam	VEERAPANDI
524	RECHARGE SHAFT	78.123	11.864	Kadayampatti A/c	KADAYAMPATTI
525	RECHARGE SHAFT	78.250	11.403	Kalkurchi	KALAPPANAIKANPATTI
526	RECHARGE SHAFT	78.142	11.408	Kalyani	PUDUCHATRAM
527	RECHARGE SHAFT	78.009	11.555	Kanagiri	ERNAPURAM
528	RECHARGE SHAFT	78.029	11.546	Kandarakulamanickam	ERNAPURAM
529	RECHARGE SHAFT	78.033	11.541	Kandarakulamanickam	ERNAPURAM
530	RECHARGE SHAFT	78.035	11.803	Kanjanayachanpatti	SEMMANDAPPATTI
531	RECHARGE SHAFT	78.046	11.808	Kanjanayachanpatti	SEMMANDAPPATTI
532	RECHARGE SHAFT	77.148	11.245	Kanjappali	ANNUR(N)

533	RECHARGE SHAFT	77.937	11.573	Kannanderi	ERNAPURAM
534	RECHARGE SHAFT	78.186	11.384	Kannurpatti	PUDUCHATRAM
535	RECHARGE SHAFT	77.177	11.246	Kanur	CHEYUR
536	RECHARGE SHAFT	78.032	11.660	Karichipatti	THIRUMALAIGIRI
537	RECHARGE SHAFT	77.887	11.445	Kasturipatti	SANKARI WEST
538	RECHARGE SHAFT	77.872	11.466	Kasturipatti	SANKARI WEST
539	RECHARGE SHAFT	77.886	11.443	Kasturipatti	SANKARI WEST
540	RECHARGE SHAFT	77.715	11.451	Katteri	SANKARI WEST
541	RECHARGE SHAFT	77.733	11.456	Katteri	SANKARI WEST
542	RECHARGE SHAFT	77.734	11.453	Katteri	SANKARI WEST
543	RECHARGE SHAFT	77.755	11.489	Katteri	SANKARI WEST
544	RECHARGE SHAFT	77.753	11.487	Katteri	SANKARI WEST
545	RECHARGE SHAFT	78.049	11.678	Keeraipappambadi	THIRUMALAIGIRI
546	RECHARGE SHAFT	78.156	11.517	Keeranur	VENNANDUR
547	RECHARGE SHAFT	78.078	11.160	Kilsathambur	NALLIPALAYAM
548	RECHARGE SHAFT	78.028	11.463	Kolankondai	MALLASAMUDRAM
549	RECHARGE SHAFT	77.979	11.293	Kolaram	NALLUR(N)
550	RECHARGE SHAFT	78.188	11.664	KOMARASAMIPATTI	SALEM_TOWN
551	RECHARGE SHAFT	78.203	11.451	Konaripatti A/b	RASIPURAM
552	RECHARGE SHAFT	77.910	11.626	Konasamudram	KONGANAPURAM
553	RECHARGE SHAFT	77.915	11.584	Konganapuram	KONGANAPURAM
554	RECHARGE SHAFT	77.992	11.842	Kongupatti	SEMMANDAPPATTI
555	RECHARGE SHAFT	78.029	11.857	Kongupatti	SEMMANDAPPATTI
556	RECHARGE SHAFT	77.992	11.842	Kongupatti	SEMMANDAPPATTI
557	RECHARGE SHAFT	77.992	11.842	Kongupatti	SEMMANDAPPATTI
558	RECHARGE SHAFT	78.083	11.180	Konur	NALLIPALAYAM
559	RECHARGE SHAFT	77.986	11.472	Koothanatham	MALLASAMUDRAM
560	RECHARGE SHAFT	77.898	11.620	Koranampatti	KONGANAPURAM
561	RECHARGE SHAFT	77.909	11.600	Koranampatti	KONGANAPURAM
562	RECHARGE SHAFT	78.211	11.679	Korathupatti	VALASAIYUR
563	RECHARGE SHAFT	78.058	11.753	Kottaimettupatti A/b	OMALUR
564	RECHARGE	77.523	11.542	Kuppandampalayam	Athani(E)

	SHAFT				
565	RECHARGE SHAFT	77.528	11.541	Kuppandampalayam	Athani(E)
566	RECHARGE SHAFT	77.882	11.578	Kurubapatti	KONGANAPURAM
567	RECHARGE SHAFT	77.878	11.575	Kurubapatti	KONGANAPURAM
568	RECHARGE SHAFT	77.885	11.592	Kurubapatti	KONGANAPURAM
569	RECHARGE SHAFT	77.979	11.686	Kurukkapatti	THARAMANGALAM
570	RECHARGE SHAFT	78.151	11.431	Kurukkapuram	RASIPURAM
571	RECHARGE SHAFT	78.120	11.379	Lakkapuram	SELLAPPAMPATTI
572	RECHARGE SHAFT	78.016	11.730	M.cheetipatti	OMALUR
573	RECHARGE SHAFT	78.065	11.492	Madiampatti	RASIPURAM
574	RECHARGE SHAFT	78.162	11.532	Malaiyampalayam	VENNANDUR
575	RECHARGE SHAFT	78.036	11.496	MALLASAMUDRAM	MALLASAMUDRAM
576	RECHARGE SHAFT	78.040	11.496	MALLASAMUDRAM	MALLASAMUDRAM
577	RECHARGE SHAFT	78.017	11.477	Mallasamudram (west)	MALLASAMUDRAM
578	RECHARGE SHAFT	78.154	11.543	MALLUR	PANAMARATHUPPATTI
579	RECHARGE SHAFT	78.070	11.506	Mamundi Agraharam A/b	MALLASAMUDRAM
580	RECHARGE SHAFT	77.952	11.777	Manathal	THARAMANGALAM
581	RECHARGE SHAFT	77.955	11.781	Manathal	THARAMANGALAM
582	RECHARGE SHAFT	77.889	11.506	Manjakalpatti A/b	SANKARI EAST
583	RECHARGE SHAFT	78.178	11.269	Marurpatti A/c	SENTHAMANGALAM
584	RECHARGE SHAFT	78.232	11.657	Masinayakkampatti	KARIPPATTI
585	RECHARGE SHAFT	78.111	11.492	Mattuvelampatti	RASIPURAM
586	RECHARGE SHAFT	77.972	11.824	Mecheri	MECHERI
587	RECHARGE SHAFT	77.291	11.335	Mettanam	NAMBIYUR
588	RECHARGE SHAFT	78.252	11.678	Mettupattithathanur	PANAMARATHUPPATTI
589	RECHARGE SHAFT	78.083	11.535	Minnakkal (s)	VENNANDUR
590	RECHARGE SHAFT	78.212	11.400	Molapalayam	RASIPURAM
591	RECHARGE SHAFT	78.229	11.409	Molapalayam	RASIPURAM
592	RECHARGE SHAFT	78.053	11.858	Mookanur	SEMMANDAPPATTI
593	RECHARGE SHAFT	77.861	11.442	Morur A/c	SANKARI WEST
594	RECHARGE SHAFT	77.895	11.419	Morur A/c	SANKARI WEST
595	RECHARGE SHAFT	77.910	11.436	Morur A/c	SANKARI WEST

596	RECHARGE SHAFT	77.857	11.419	Morur A/c	SANKARI WEST
597	RECHARGE SHAFT	77.851	11.426	Morur A/c	SANKARI WEST
598	RECHARGE SHAFT	78.182	11.422	Murungapatty	RASIPURAM
599	RECHARGE SHAFT	78.095	11.490	Nadupatti	RASIPURAM
600	RECHARGE SHAFT	78.020	11.560	Naduvaneri	ERNAPURAM
601	RECHARGE SHAFT	78.017	11.570	Naduvaneri	ERNAPURAM
602	RECHARGE SHAFT	78.018	11.582	Naduvaneri	ERNAPURAM
603	RECHARGE SHAFT	77.539	11.581	Nagalur	Athani(E)
604	RECHARGE SHAFT	77.535	11.577	Nagalur	Athani(E)
605	RECHARGE SHAFT	78.136	11.593	Nallikkalpatti	PANAMARATHUPPATTI
606	RECHARGE SHAFT	78.145	11.590	Nallikkalpatti	PANAMARATHUPPATTI
607	RECHARGE SHAFT	78.164	11.265	Nallipalayam A/c	NALLIPALAYAM
608	RECHARGE SHAFT	77.170	11.379	Nallur	PUNJAIPULIAMPATTI
609	RECHARGE SHAFT	78.274	11.460	Namagiripet	NAMAGIRIPETTAI
610	RECHARGE SHAFT	78.179	11.257	Namakkal A/c	NAMAKKAL
611	RECHARGE SHAFT	77.891	11.761	Nangavalli A/b	NANGAVALLI
612	RECHARGE SHAFT	78.129	11.666	NARASOJIPATTI	SURAMANGALAM
613	RECHARGE SHAFT	78.141	11.666	NARASOJIPATTI	SURAMANGALAM
614	RECHARGE SHAFT	78.158	11.381	Navani	PUDUCHATRAM
615	RECHARGE SHAFT	78.145	11.389	Navani	PUDUCHATRAM
616	RECHARGE SHAFT	77.095	11.245	Odderpalayam	ANNUR(N)
617	RECHARGE SHAFT	77.924	11.524	Olakkachinnanur	SANKARI EAST
618	RECHARGE SHAFT	77.901	11.520	Olakkachinnanur	SANKARI EAST
619	RECHARGE SHAFT	78.175	11.406	Pachchai	PUDUCHATRAM
620	RECHARGE SHAFT	78.160	11.643	PALLAPATTI (TN-1)	SURAMANGALAM
621	RECHARGE SHAFT	78.256	11.391	Pallipatti	KALAPPANAIKANPATTI
622	RECHARGE SHAFT	78.162	11.566	Panamarathupatti	PANAMARATHUPPATTI
623	RECHARGE SHAFT	78.070	11.829	Pannapatti	SEMMANDAPPATTI
624	RECHARGE SHAFT	78.077	11.836	Pannapatti	SEMMANDAPPATTI
625	RECHARGE SHAFT	77.957	11.635	Pappambadi	THARAMANGALAM
626	RECHARGE SHAFT	78.066	11.525	PAPPARAPATTI	VEMBADITHALAM
627	RECHARGE	78.205	11.478	Pattanam	RASIPURAM

	SHAFT				
628	RECHARGE SHAFT	78.213	11.474	Pattanam	RASIPURAM
629	RECHARGE SHAFT	78.215	11.484	Pattanam	RASIPURAM
630	RECHARGE SHAFT	78.205	11.484	Pattanam	RASIPURAM
631	RECHARGE SHAFT	78.060	11.850	Poosaripatti	SEMMANDAPPATTI
632	RECHARGE SHAFT	77.239	11.287	Pothampalayam	CHEYUR
633	RECHARGE SHAFT	78.208	11.286	Pottanam	SELLAPPAMPATTI
634	RECHARGE SHAFT	78.077	11.781	Pottipuram	OMALUR
635	RECHARGE SHAFT	78.288	11.487	Pudupatti	NAMAGIRIPETTAI
636	RECHARGE SHAFT	77.960	11.582	Pudur	ERNAPURAM
637	RECHARGE SHAFT	77.969	11.581	Pudur	ERNAPURAM
638	RECHARGE SHAFT	77.982	11.575	Pudur	ERNAPURAM
639	RECHARGE SHAFT	77.960	11.565	Pudur	ERNAPURAM
640	RECHARGE SHAFT	77.966	11.567	Pudur	ERNAPURAM
641	RECHARGE SHAFT	77.968	11.573	Pudur	ERNAPURAM
642	RECHARGE SHAFT	77.819	11.243	Punjai Kalamangalam A/b	MODAKURICHI
643	RECHARGE SHAFT	77.161	11.328	Punjaipuliampatti A/b	PUNJAIPULIAMPATTI
644	RECHARGE SHAFT	78.059	11.552	Rakkipatti	VEMBADITHALAM
645	RECHARGE SHAFT	78.181	11.409	Ramanayakkanpatti	PUDUCHATRAM
646	RECHARGE SHAFT	78.104	11.195	Rasampalayam	NALLIPALAYAM
647	RECHARGE SHAFT	78.100	11.198	Rasampalayam	NALLIPALAYAM
648	RECHARGE SHAFT	78.183	11.463	RASIPURAM	RASIPURAM
649	RECHARGE SHAFT	78.139	11.687	Reddiyur	SURAMANGALAM
650	RECHARGE SHAFT	78.172	11.650	SALEM	SALEM_TOWN
651	RECHARGE SHAFT	78.186	11.651	SALEM	SALEM_TOWN
652	RECHARGE SHAFT	78.171	11.637	SALEM	SALEM_TOWN
653	RECHARGE SHAFT	77.918	11.675	Samudram	KONGANAPURAM
654	RECHARGE SHAFT	78.143	11.564	Sandiyur	PANAMARATHUPPATTI
655	RECHARGE SHAFT	77.852	11.462	Sankari	SANKARI WEST
656	RECHARGE SHAFT	77.859	11.457	Sankari	SANKARI WEST
657	RECHARGE SHAFT	77.866	11.471	Sankari	SANKARI WEST
658	RECHARGE SHAFT	77.857	11.463	Sankari	SANKARI WEST

659	RECHARGE SHAFT	77.834	11.444	Sanniyasipatti	SANKARI WEST
660	RECHARGE SHAFT	78.114	11.403	Sarkarnattamangalam	PUDUCHATRAM
661	RECHARGE SHAFT	78.117	11.256	Seiluvampatti A/c	NALLIPALAYAM
662	RECHARGE SHAFT	77.921	11.714	Selavadi	THARAMANGALAM
663	RECHARGE SHAFT	78.087	11.497	Semmandapatti	RASIPURAM
664	RECHARGE SHAFT	78.009	11.791	Semmandapatti	SEMMANDAPPATTI
665	RECHARGE SHAFT	78.024	11.794	Semmandapatti	SEMMANDAPPATTI
666	RECHARGE SHAFT	78.016	11.802	Semmandapatti	SEMMANDAPPATTI
667	RECHARGE SHAFT	78.041	11.560	SENAIPALAIYAM	VEMBADITHALAM
668	RECHARGE SHAFT	77.997	11.715	Sikkampatti	OMALUR
669	RECHARGE SHAFT	78.209	11.431	Singalandapuram A/d	RASIPURAM
670	RECHARGE SHAFT	78.223	11.433	Singalandapuram A/d	RASIPURAM
671	RECHARGE SHAFT	77.929	11.486	Sungudivaradampatti	SANKARI EAST
672	RECHARGE SHAFT	77.891	11.725	Surappalli A/b	NANGAVALLI
673	RECHARGE SHAFT	77.860	11.565	Tangayur	KONGANAPURAM
674	RECHARGE SHAFT	77.873	11.557	Tangayur	KONGANAPURAM
675	RECHARGE SHAFT	78.008	11.599	Teppakkutai	ERNAPURAM
676	RECHARGE SHAFT	77.991	11.598	Teppakkutai	ERNAPURAM
677	RECHARGE SHAFT	78.150	11.299	Thalambadi	SELLAPPAMPATTI
678	RECHARGE SHAFT	77.208	11.277	Thandukkarampalayam	CHEYUR
679	RECHARGE SHAFT	78.163	11.485	Thengalpalayam	VENNANDUR
680	RECHARGE SHAFT	78.178	11.511	Thengalpalayam	VENNANDUR
681	RECHARGE SHAFT	78.086	11.227	Thindamangalam A/b	NALLIPALAYAM
682	RECHARGE SHAFT	78.208	11.376	Thirumalaipatti	PUDUCHATRAM
683	RECHARGE SHAFT	78.224	11.369	Thirumalaipatti	PUDUCHATRAM
684	RECHARGE SHAFT	78.119	11.208	Thottippatti	VALAIYAPATTI
685	RECHARGE SHAFT	78.018	11.752	Tindamangalam	OMALUR
686	RECHARGE SHAFT	78.093	11.645	Tirumalagiri	THIRUMALAIGIRI
687	RECHARGE SHAFT	78.073	11.820	Tumbipadi	OMALUR
688	RECHARGE SHAFT	78.092	11.803	Tumbipadi	OMALUR
689	RECHARGE SHAFT	78.089	11.798	Tumbipadi	OMALUR
690	RECHARGE	77.946	11.491	Uthupalayam	SANKARI EAST

	SHAFT				
691	RECHARGE SHAFT	77.948	11.495	Uthupalayam	SANKARI EAST
692	RECHARGE SHAFT	77.097	11.264	Vadakkalur	ANNUR(N)
693	RECHARGE SHAFT	78.247	11.471	Vadugam Muhiappampalayam	NAMAGIRIPETTAI
694	RECHARGE SHAFT	77.920	11.466	Vadugapatti	SANKARI EAST
695	RECHARGE SHAFT	77.919	11.463	Vadugapatti	SANKARI EAST
696	RECHARGE SHAFT	77.943	11.474	Vadugapatti	SANKARI EAST
697	RECHARGE SHAFT	77.946	11.473	Vadugapatti	SANKARI EAST
698	RECHARGE SHAFT	77.916	11.487	Valayasettipalayam	SANKARI EAST
699	RECHARGE SHAFT	78.114	11.216	Vallipuram	NALLIPALAYAM
700	RECHARGE SHAFT	78.136	11.209	Vallipuram	NALLIPALAYAM
701	RECHARGE SHAFT	77.874	11.746	Vanavasi A/b	NANGAVALLI
702	RECHARGE SHAFT	78.078	11.575	Veerapandi	VEERAPANDI
703	RECHARGE SHAFT	77.823	11.643	Vellarivalli	POOLAMPATTI
704	RECHARGE SHAFT	77.794	11.634	Vellarivalli	POOLAMPATTI
705	RECHARGE SHAFT	77.785	11.640	Vellarivalli	POOLAMPATTI
706	RECHARGE SHAFT	77.572	11.525	Vembathi	Athani(E)
707	RECHARGE SHAFT	77.577	11.523	Vembathi	Athani(E)
708	RECHARGE SHAFT	77.575	11.519	Vembathi	Athani(E)
709	RECHARGE SHAFT	77.581	11.518	Vembathi	Athani(E)
710	RECHARGE SHAFT	77.577	11.521	Vembathi	Athani(E)
711	RECHARGE SHAFT	77.574	11.484	Vembathi	Athani(E)
712	RECHARGE SHAFT	77.570	11.479	Vembathi	Athani(E)
713	RECHARGE SHAFT	77.572	11.483	Vembathi	Athani(E)
714	RECHARGE SHAFT	78.088	11.513	VENNANDUR	VENNANDUR
715	RECHARGE SHAFT	77.941	11.470	Veppampatti	SANKARI EAST
716	RECHARGE SHAFT	77.795	11.459	Virachchipalayam	SANKARI WEST
717	RECHARGE SHAFT	78.114	11.592	Agraharapulaveri A/b	VEERAPANDI
718	RECHARGE SHAFT	78.082	11.470	Akkaraipatti A/c	RASIPURAM
719	RECHARGE SHAFT	78.083	11.463	Akkaraipatti A/c	RASIPURAM
720	RECHARGE SHAFT	77.950	11.693	Arurpatti	THARAMANGALAM
721	RECHARGE SHAFT	77.863	11.650	Chettimankurichi	EDAPPADI

722	RECHARGE SHAFT	77.889	11.635	Dadapuram	EDAPPADI
723	RECHARGE SHAFT	77.894	11.634	Dadapuram	EDAPPADI
724	RECHARGE SHAFT	77.967	11.670	Desavilakku A/b	THARAMANGALAM
725	RECHARGE SHAFT	77.969	11.674	Desavilakku A/b	THARAMANGALAM
726	RECHARGE SHAFT	77.828	11.564	Devanakavandanur A/b	SANKARI EAST
727	RECHARGE SHAFT	77.834	11.568	Devanakavandanur A/b	SANKARI EAST
728	RECHARGE SHAFT	77.841	11.566	Devanakavandanur A/b	SANKARI EAST
729	RECHARGE SHAFT	77.834	11.563	Devanakavandanur A/b	SANKARI EAST
730	RECHARGE SHAFT	77.953	11.485	Gedikaval	ERNAPURAM
731	RECHARGE SHAFT	77.948	11.485	Gedikaval	ERNAPURAM
732	RECHARGE SHAFT	77.949	11.482	Gedikaval	ERNAPURAM
733	RECHARGE SHAFT	77.952	11.483	Gedikaval	ERNAPURAM
734	RECHARGE SHAFT	77.858	11.617	IDAPPADI	EDAPPADI
735	RECHARGE SHAFT	77.848	11.619	IDAPPADI	EDAPPADI
736	RECHARGE SHAFT	77.967	11.511	Irugalur	SANKARI EAST
737	RECHARGE SHAFT	78.195	11.597	Jerugumalai	PANAMARATHUPPATTI
738	RECHARGE SHAFT	78.198	11.607	Jerugumalai	PANAMARATHUPPATTI
739	RECHARGE SHAFT	78.204	11.604	Jerugumalai	PANAMARATHUPPATTI
740	RECHARGE SHAFT	78.068	11.768	Kamalapuram	OMALUR
741	RECHARGE SHAFT	78.070	11.766	Kamalapuram	OMALUR
742	RECHARGE SHAFT	78.074	11.766	Kamalapuram	OMALUR
743	RECHARGE SHAFT	78.078	11.765	Kamalapuram	OMALUR
744	RECHARGE SHAFT	78.057	11.745	Kullamanickenpatti	OMALUR
745	RECHARGE SHAFT	78.057	11.739	Kullamanickenpatti	OMALUR
746	RECHARGE SHAFT	77.869	11.607	Kurubapatti	KONGANAPURAM
747	RECHARGE SHAFT	77.871	11.613	Kurubapatti	KONGANAPURAM
748	RECHARGE SHAFT	78.008	11.516	Mangalam	MALLASAMUDRAM
749	RECHARGE SHAFT	78.018	11.520	Mangalam	MALLASAMUDRAM
750	RECHARGE SHAFT	78.012	11.514	Mangalam	MALLASAMUDRAM
751	RECHARGE SHAFT	78.017	11.517	Mangalam	MALLASAMUDRAM
752	RECHARGE SHAFT	78.005	11.516	Mangalam	MALLASAMUDRAM
753	RECHARGE	78.048	11.661	MARAMANGALATHUPATTI	THIRUMALAIGIRI

	SHAFT				
754	RECHARGE SHAFT	78.052	11.664	MARAMANGALATHUPATTI	THIRUMALAIGIRI
755	RECHARGE SHAFT	77.877	11.430	Morur A/c	SANKARI WEST
756	RECHARGE SHAFT	77.880	11.428	Morur A/c	SANKARI WEST
757	RECHARGE SHAFT	77.882	11.425	Morur A/c	SANKARI WEST
758	RECHARGE SHAFT	78.007	11.580	Naduvaneri	ERNAPURAM
759	RECHARGE SHAFT	78.010	11.574	Naduvaneri	ERNAPURAM
760	RECHARGE SHAFT	78.118	11.608	NEYKKARAPPATTI	VEERAPANDI
761	RECHARGE SHAFT	78.027	11.734	Omalur A/b	OMALUR
762	RECHARGE SHAFT	78.024	11.730	Pachanampatti	OMALUR
763	RECHARGE SHAFT	78.193	11.574	Panamarathupatti	PANAMARATHUPPATTI
764	RECHARGE SHAFT	78.196	11.579	Panamarathupatti	PANAMARATHUPPATTI
765	RECHARGE SHAFT	77.968	11.636	Pappambadi	THARAMANGALAM
766	RECHARGE SHAFT	78.120	11.614	PUTTUR (TN)	SURAMANGALAM
767	RECHARGE SHAFT	77.945	11.691	Ramireddipatti	THARAMANGALAM
768	RECHARGE SHAFT	77.979	11.504	Sanbagamahadevi	MALLASAMUDRAM
769	RECHARGE SHAFT	78.077	11.659	Sarkar Gollappatti	THIRUMALAIGIRI
770	RECHARGE SHAFT	78.082	11.658	Sarkar Gollappatti	THIRUMALAIGIRI
771	RECHARGE SHAFT	77.885	11.554	Tangayur	KONGANAPURAM
772	RECHARGE SHAFT	77.888	11.553	Tangayur	KONGANAPURAM
773	RECHARGE SHAFT	77.887	11.552	Tangayur	KONGANAPURAM
774	RECHARGE SHAFT	77.968	11.707	TARAMANGALAM	THARAMANGALAM
775	RECHARGE SHAFT	77.974	11.706	TARAMANGALAM	THARAMANGALAM
776	RECHARGE SHAFT	78.114	11.597	Uthamasolapuram	VEERAPANDI
777	RECHARGE SHAFT	77.948	11.487	Uthupalayam	SANKARI EAST
778	RECHARGE SHAFT	77.939	11.525	Vaikuntam	ERNAPURAM
779	RECHARGE SHAFT	77.933	11.547	Vaikuntam	ERNAPURAM
780	RECHARGE SHAFT	78.252	11.484	Vedugam	NAMAGIRIPETTAI
781	RECHARGE SHAFT	78.257	11.482	Vedugam	NAMAGIRIPETTAI
782	RECHARGE SHAFT	77.930	11.639	Vellalapuram	KONGANAPURAM
783	RECHARGE SHAFT	77.935	11.641	Vellalapuram	KONGANAPURAM
784	RECHARGE SHAFT	77.935	11.645	Vellalapuram	KONGANAPURAM